



BLM Federal Coal Lease (LBA OHES 057390)

**Athens Ranger District
Wayne National Forest**

**Perry and Morgan Counties
Ohio**

September 2013

Type of Statement: Environmental Assessment

Lead Agency: USDA Forest Service

Deciding Official: Anne Carey
Forest Supervisor
13700 US Hwy 33
Nelsonville, OH 45764
740-753-0101

For more information: Rich Jones
Minerals Program Manager
13700 US Hwy 33
Nelsonville, OH 45764
740-753-0101

Cooperating Agency: USDOJ Bureau of Land
Management

**Cooperating Agency Deciding
Official:** Larry Denny
Deputy State Director
Division of Natural Resources
703-440-1535

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.)

Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TTY).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TTY). USDA is an equal opportunity provider and employer.

Printed on recycled paper

Table of Contents



BLM Federal Coal Lease OHES 057390

Chapter 1 – Purpose and Need	1
Document Structure	1
Purpose and Need for Action.....	1
Proposed Action.....	2
Forest Plan Direction	2
Leasing Process.....	2
Decision Framework	3
Public Involvement.....	4
Issues.....	4
Chapter 2 - Alternatives.....	6
Alternative 1 – The Proposed Action.....	6
Alternative 2 – No Action.....	7
Chapter 3 - Environmental Consequences	11
General Affected Environment	11
Groundwater.....	12
Surface Water	21
Greenhouse Gas Emissions.....	36
Air Quality	45
Wildlife	47
Botanical, Cultural, Soil and Recreation Resources	56
Chapter 4 - Consultation and Coordination	57
APPENDIX A: Greenhouse Gas Calculations	
APPENDIX B: Response to Scoping Comments	
APPENDIX C: Works Cited	

Chapter 1 – Purpose and Need

Document Structure

The Forest Service has prepared this Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This EA discloses the direct, indirect and cumulative environmental impacts that would result from the proposed action and alternatives and is organized into five parts:

- **Introduction:** The section includes information on the history of the project proposal, the purpose of and need for the project and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.
- **Description of Alternatives, including the Proposed Action:** This section provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on issues raised by the public and other agencies. This discussion also includes possible mitigation measures.
- **Environmental Consequences:** This section describes the environmental effects of implementing the proposed action and other alternatives. Within each section, the affected environment is described first, followed by the effects of the No Action Alternative that provides a baseline for evaluation and comparison of the other alternatives that follow.
- **Agencies and Persons Consulted:** This section provides a list of preparers and agencies consulted during the development of the environmental assessment.
- **Appendices:** The appendices provide more detailed information to support the analyses presented in the environmental assessment.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the Athens Ranger District Office in Nelsonville, Ohio.

Purpose and Need for Action

The purpose of and need for this project is to respond to a federal coal lease by application. Various federal laws and policies direct the BLM to offer federal minerals for lease. Since the application involves "acquired" national forest system (NFS) lands, the applicable legal authority is the Mineral Leasing Act for Acquired Lands of 1947. The lease by application is being processed according to BLM's Leasing by Application Regulations, at 43 Code of Federal Regulations 3425. This legal framework requires BLM to have the consent of the Forest Service before offering NFS lands for coal leasing.

The agencies' actions are also responsive to the federal government's continuing policy to "foster and encourage private enterprise in the development of economically sound and stable domestic

mining, minerals, metal and mineral reclamation industries, and the orderly and economic development of domestic minerals”.

Proposed Action

The project proposal is for the Wayne National Forest (WNF) to offer consent to BLM for the lease of seven noncontiguous parcels totaling to 432.54 acres, and for the BLM to subsequently offer the parcels up for a competitive lease. The parcels are located north of Glouster and east of the community of Corning at T12N, R14W, Sections 12, 13, 14 and 24 (Monroe Township, Perry County) and T8N, R13W, Sections 18 and 19 (Union Township, Morgan County).

The leasing action only results in a conveyance of rights, it does not authorize any actual mining or on the ground disturbance. Any specific mining proposals would be subject to a post-lease permitting process under the jurisdiction of the Ohio Department of Natural Resources, Division of Mineral Resources Management and the US Department of the Interior Office of Surface Mining (OSM). For the purposes of this analysis and disclosure of potential effects, the WNF and BLM considered a “likely development scenario” for mining. More information on the proposed action and the likely development scenario is found in the description of the alternatives found in Chapter 2; however, it is important to note upfront that the likely development scenario limits mining to underground methods.

Forest Plan Direction

The 2006 WNF Land and Resource Management Plan (Forest Plan) provides direction to the Forest related to minerals management, including Goal 10.1, which states the Forest should provide a supply of mineral commodities for current and future generations, while protecting the long-term health and biological diversity of ecosystems, and facilitate the orderly exploration, development, and production of mineral and energy resources on land open to these activities. Objective 10.1a states that the WNF will coordinate with the BLM to offer leases of federally owned minerals.

Leasing Process

The federal government maintains a policy of encouraging private industry to explore and develop federal minerals, to help satisfy local and national need (Mining and Mineral Policy Act of 1970). The issuance of a coal lease is a legal contract between the federal government and the lessee. This contract grants the lessee the exclusive rights to explore and develop the coal resources in their lease. In order for a mining company to access federal coal reserves, the company must first apply to lease the federal lands for development of the coal resource. A lease application is submitted to the BLM, which administers the federal mineral estate. The BLM

assesses the priority of applications and initiates the lease consideration process, which includes ensuring that a NEPA analysis is completed. Where necessary, the BLM cooperates with the Surface Management Agency (SMA). For the BLM Coal Lease OHES – 057390, the WNF is the SMA and has taken the lead on completing the NEPA analysis, with the BLM having cooperator status.

Once the NEPA is completed and if the decision is made to implement the proposed action, the BLM will proceed with preparing to hold a lease sale for the parcels. Prior to the sale, the BLM will hold a public hearing during which members of the public can provide input on the value of the coal. The BLM would then hold a competitive coal lease sale. The lease would be awarded to a qualified bidder whose bid meets or exceeds BLM's determination of the fair market value of the coal.

If a lease is issued, the lessee would then be required to obtain a coal mining permit from the State of Ohio. Coal mine permitting is governed by the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The SMCRA established the federal Office of Surface Mining, and allows for individual states to be granted primacy in implementing its requirements. Such is the case in Ohio. The Ohio Division of Mineral Resources Management would be responsible for the permitting process with oversight from OSM according to SMCRA's implementing regulations at 30 CFR Part 700, and the Ohio Revised Code Chapter 1561. The Forest Service, as a federal land managing agency under the SMCRA, would participate in this process and provide information on post-mining land use and adequacy of measures to protect the lands and resources within its jurisdiction. The BLM also participates in this process with approvals of resource recovery and protection plans for the federal coal resources. Certain permitting actions require the OSM to also approve a federal mining plan. In such a case, the OSM would seek concurrences from the Forest Service and BLM on the terms of the mining plan approval.

Decision Framework

The WNF Forest Supervisor is the Deciding Official for the consent decision on the proposed lease parcels. Given the purpose and need, the Deciding Official will review the proposed action, the no action alternative and the environmental consequences in order to decide the following:

- Whether or not to consent to BLM leasing the parcels included in Lease By Application OHES 057390 according to the Mineral Leasing Act for Acquired Lands of 1947;
- If consent is given, whether or not project specific stipulations are needed to provide for the protection of non-mineral resources.

The Forest Service Deciding Official will determine if the activity is consistent with the WNF Forest Plan. The Forest Service decision will be made based on the analysis relative to the No Action and Proposed Action Alternatives.

The BLM Deciding Official is the Deputy State Director for Minerals. The BLM is the leasing authority for all federal coal reserves under the Mineral Leasing Act for Acquired Lands of 1947. The Deputy State Director for Minerals must decide:

- Whether to issue a Finding of No Significant Impact
- Whether to offer Lease By Application OHES 057390 for competitive leasing and what terms, conditions, and stipulations are needed on the lease to ensure compliance with the MLA, as amended. If the Authorized Officer makes an affirmative judgment, he will recommend to the Eastern States Director that the coal lease, as delineated, should be offered for sale through the competitive bidding process.

Public Involvement

The proposal was first listed in the Schedule of Proposed Actions on January 1, 2013. The proposal was provided to the public and other agencies for an initial scoping period from 12/17/2012 to 1/4/2013. One scoping response was received during the scoping period, which was concerned with protecting water quality and mitigating greenhouse gas emissions. Another response was received after the scoping period. This response was concerned with impacts to threatened, endangered and sensitive species as well as the generation of pollutants. The Forest responded to the comments received. These responses are found within Appendix B.

Using the comments from the scoping responses and information provided by resource specialists, the interdisciplinary team (IDT) developed a list of issues to address.

Issues

Several key issues were identified by the IDT and the scoping process. These issues were explored through the analysis contained in Chapter 3 and the Project Record. One “non-issue” is addressed here, as well.

Water Quality: The Wayne National Forest and partners have spent millions of dollars remediating the effects of mining on the watersheds of the National Forest. The outcomes of this partnership have been overwhelmingly positive, with the water quality in watersheds impacted by acid mine drainage (AMD) vastly improved over conditions present fifteen years ago. There is concern that consenting to lease the parcels and any subsequent mining that may occur would cause problems with subsidence and stream capture, resulting in AMD, thus adding new sources of pollution to the landscape. A hydrologist and hydrogeologist have analyzed and disclosed the potential impacts to surface water and groundwater that may result from the proposed action. Mitigations/stipulations are identified within the resource discussions contained in Chapter 3 of this Environmental Assessment.

Greenhouse Gas (GHG) Generation: Scoping responses revealed concern that if the parcels were leased and then subsequently mined there would be amounts of GHGs released into the

atmosphere that would contribute to global climate change. The Forest has analyzed and disclosed the estimated GHGs in Chapter 3 of this Environmental Assessment. Threatened, Endangered and Sensitive Species: A wildlife biologist and botanist have analyzed and disclosed the potential impacts to plants and animals that may result from the proposed action. Mitigations/stipulations are identified within the resource discussions contained in Chapter 3 of this Environmental Assessment.

Non-Issue: Socioeconomics: The topic of socioeconomics was not raised through public scoping or through internal scoping with WNF specialists.

There will be revenue realized if the WNF consents to leasing the parcels and the BLM does issue a lease. Revenue generated from the leasing of federally owned coal is shared with the state. The Forest Service does not receive any of the revenue from coal leasing; rather, the dollars are passed through the BLM for distribution to the state with federal land ownership and the US Department of the Treasury. Revenue is collected at three points. There is a bonus paid at the time BLM issues a lease. This amount varies based on the sale amount of the lease. There is an annual rental rate for coal leases of \$3 per acre. There is a production royalty which is established by law at approximately 12%. Should the federal parcels not be leased, the revenue will not be provided to the public.

In Ohio, coal was produced at 74 mines in 16 counties during 2011. Of 25 coal producing states, Ohio ranked eleventh in 2011. Ohio coal is primarily used to generate electricity, 82% of Ohio's electricity is produced by burning coal. The total average annual employment of coal mining jobs in Ohio in 2011 was 2,995 employees. Two underground coal mines in Perry County reported a 2011 production of 2.5 million short tons of coal, with a reported value of \$96 million. Perry County has an unemployment rate of 8.2 percent. Economic contributions from coal mining to the region and local economies stem from property taxes on mineral interest, income taxes from the jobs provided, revenue paid to counties when federal coal is leased and demand for supplies and services for the mine and its employees.

The proposed lease parcels are non-contiguous, thus they would not all be accessed within the same year, and are of relatively small acreage, thus there is not a great deal of coal to be recovered (approximately one year's worth of recoverable coal – see GHG discussion in Chapter 3 for more details). If consent to lease were given, the parcels were leased and then were subsequently mined, it is not likely that there would be additional jobs or the need for large equipment purchases. Economic contributions would occur, but would be relatively small. For those reasons it is determined that the revenue generated would be an inconsequential factor when considering whether or not to approve the proposed action.

Chapter 2 - Alternatives

Alternative 1 – The Proposed Action

The project proposal is for the Wayne National Forest to offer consent to BLM for the lease of seven parcels in Lease By Application OHES 057390 totaling to 432.54 acres of acquired land, and for the BLM to subsequently offer the parcels up for a competitive lease sale (Figure 1). Mining of the parcels is not part of this proposed action; however, for the purpose of facilitating the effects analysis, the WNF and BLM used a “likely development scenario” for mining.

The likely scenario for the development of these parcels is underground mining using existing mine entrances, with no new surface activities. The room and pillar method would be used, which allows for maximum extraction of the resource while providing for worker safety. Rooms for this method will be cut into the coal using a continuous miner. This will leave a series of pillars to help support the roof overburden and to control the flow of air. As mining advances a grid of rooms and pillars will be formed underground. The percentage of coal mined will vary, it is expected that 40-50% will be removed, leaving 50-60% behind to support the mine ceiling. The pillar coal will remain after mining is completed. Workers will also drive bolts in the roof of the rooms to aid in supporting the overburden. Because the pillars will remain there is no anticipated or planned subsidence. Water will be pumped to the existing washplant or sediment pond for treatment before off-site discharge. The coal seam is located from approximately 400 feet below ground surface (ridgetop) to approximately 85 feet below ground surface (valley). There are approximately 11,000 acres of privately held mining reserves in the immediate vicinity to the parcels in question. The federal parcels would add roughly 4% (432.54 ac) to this total.

Approximately 411 acres of the 432.54 project acres are within the Future Old Forest Management Area, which has designated a no surface occupancy stipulation (SFW-MIN-9). Within the Management Area prescription the Forest Plan states, “No surface occupancy of National Forest System land is allowed for the exploration and development of federally owned minerals, except on existing leases” (Forest Plan, p 3-24) Thus, on these 411 acres the Forest Plan directs that there will be no surface activities due to the leasing of federal coal and any subsequent mining. The remaining 22 acres are within the Diverse Continuous Forest Management Area, which does not have a restriction on surface use. However, it is consistent with the likely development scenario, which guided the effects analysis, and is the intention of the WNF to add a lease-specific stipulation on the remaining 22 acres that calls for no surface use on those lands. Therefore, if the seven parcels are leased, there would be no surface use associated with the proposed plan.

General Mitigations/Stipulations for the Proposed Action:

- For the Future Old Forest Management Area: No surface occupancy of National Forest System lands is allowed for the exploration and development of federally owned minerals, except on existing leases. (SFW-MIN-9)
- For the Diverse Continuous Forest Management Area: No surface use is permitted for the exploration and development of federally owned coal within the project area.

The Hydrogeologist has identified the need for a resource specific stipulation, which is described in the Groundwater section of Chapter 3 of the EA.

- Mining should be avoided in areas where overburden is less than 120 feet thick. According to isopach maps, this would only be in the drainages within tract x41.

Alternative 2 – No Action

Under the No Action alternative, the seven parcels in Lease By Application OHES 057390 would not be leased. Management of WNF resources would continue. Any revenues from leasing federal coal and subsequent mining would be lost. It is likely that mining of the adjacent non-federal coal would continue, which would make the coal under these parcels economically unrecoverable.

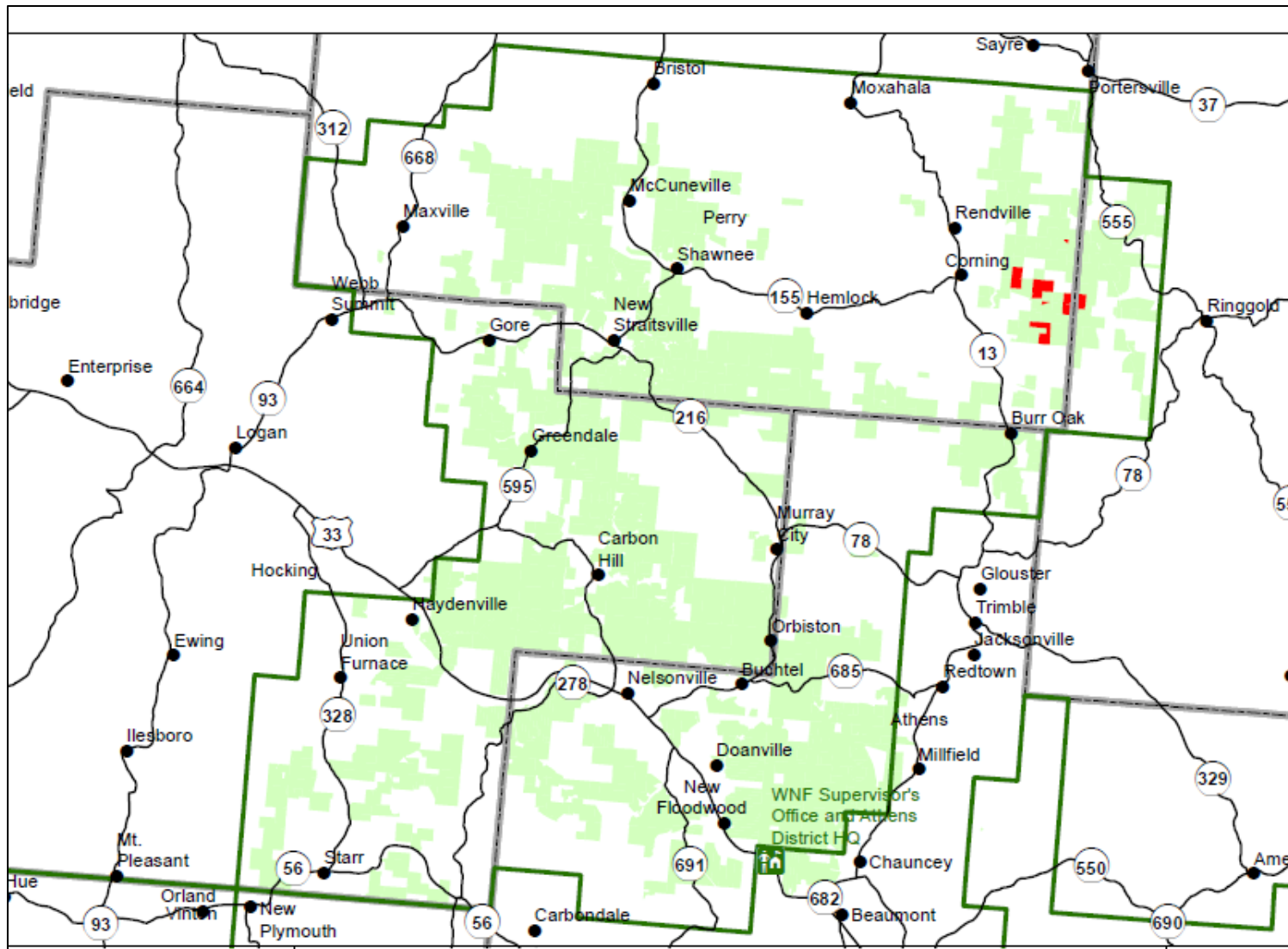


Figure 1: Vicinity Map showing Proposed Lease Parcels in Red

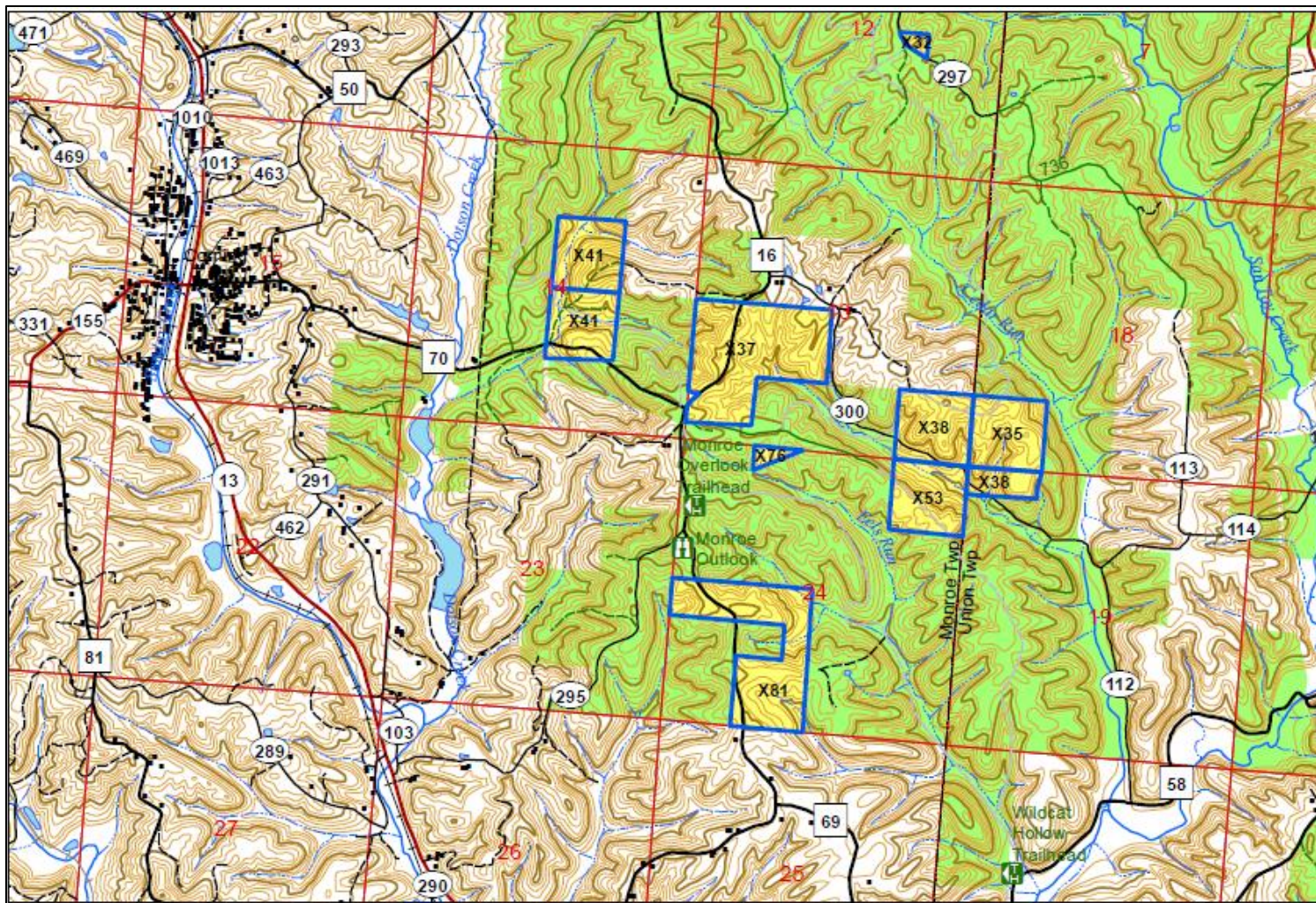


Figure 2: Topographical Map of Proposed Lease Parcels

Chapter 3 - Environmental Consequences

General Affected Environment

The following information includes a general description of the project area. Resource specific descriptions of the affected environment are included within individual analysis sections only when that description helps to frame the analysis of effects.

Management Areas

The proposed lease parcels are within two management areas: the Future Old Forest (410.94 ac) and the Diverse Continuous Forest (21.6 ac). Surface occupancy for the exploration and development of federally owned minerals is not permitted within the Future Old Forest; however it is permitted within the Diverse Continuous Forest. For each management area within the Forest Plan, a desired future condition was developed which describes the vision for the designated areas and helps guide management activities. It should be noted that the following descriptions are not necessarily reflective of the current condition, rather they describe what the blocks of forest should look like in the future, with implementation of the Forest Plan.

Future Old Forest Desired Future Condition

“The Future Old Forest Management Area (FOF) was created to emphasize providing old forest that changes only as a result of natural disturbances and natural succession. These areas offer Forest visitors opportunities to experience solitude and closeness to nature. Such opportunities may be limited in the vicinity of private oil and gas rights until the reservoirs are depleted.” (USDA FS 2006a, pg 3-23)

“Extensive stands of old central hardwoods dominate the landscape. These stands contain a mix of tree sizes but are visually dominated by large, mature trees. Numerous large, old trees, mid-sized trees, and a scattering of snags and dying trees of all sizes, as well as downed, rotting trees are present throughout this management area. The forest canopy is generally closed, but tree fall or death creates gaps that become home to dense shrub and young tree growth.” (USDA FS 2006a, pg 3-23)

Diverse Continuous Forest Desired Future Condition

“The Diverse Continuous Forest Management Area (DCF) was created to emphasize providing mature forest habitat for conservation of forest interior species. DCF is characterized by large blocks of mature forest containing a variety of tree species of various ages and sizes. These provide habitat for interior forest wildlife species. Shrubby or herbaceous openings are interspersed within tree stands, but these are generally found near the periphery of large forest blocks. The varied forest canopy closure results in understory and midstory vegetation that ranges from sparse to dense, providing a variety of vertical forest structure. Older trees and snags are well distributed. Ponds and wetlands add to the diversity of the management area.” (USDA FS 2006a, pg 3-3)

“Evidence of human activities is apparent. Resource activities such as vegetative management and mineral extraction are evident. Structures, utility corridors and timber cutting as well as mineral exploration and development are also evident. However, these structures and activities are visible mainly from on-site locations or occasionally from a distance in broken terrain.” (USDA FS 2006a, pg 3-4)

Groundwater

Affected Environment

Relevant Area Topographic and Surface Features

The proposed lease area consists of alternating ridge and valley topography characteristic of this region. Most of the area can be characterized as uplands relative to the larger region. Total relief across the area is almost 300 feet, and ranges in elevation from approximately 745 feet above Mean Sea Level (MSL) to approximately 1,030 feet MSL.

According to the most recent USGS topographic maps for the area (USDOI Geological Survey 2002 and 2011) none of the proposed lease tracts contain perennial or other permanent surface water bodies or wetlands. Some tracts, including X41, contain ephemeral streams. The Abandoned and Inactive Minelands (AIM) database maintained on the WNF indicates that there are no known seeps of significance on any of the tracts.

There are no USFS water supply wells on any of the proposed lease tracts. The reviewed topographic maps and aerial photos do not show any structures on any of the tracts that would suggest the presence of other water supply wells.

Several oil and/or gas wells are known to exist along the drainages and on other parts of tract X41 (see Figure 3 at right). The only other tract with a mapped oil and/or gas well shown on the topographic map is X37. Other wells may exist but not be shown on the map. The base map for the coal isopach map indicates the presence of various structures along the main drainage of tract X41. The WNF has indicated that these are various oil and gas field production support structures.

According to the coal lease application (Linn Engineering, Inc. 2011) and addendum (Linn Engineering, Inc. 2012a) the proposed mining will consist of underground mining of the Middle Kittanning (No. 6) coal seam of the Allegheny

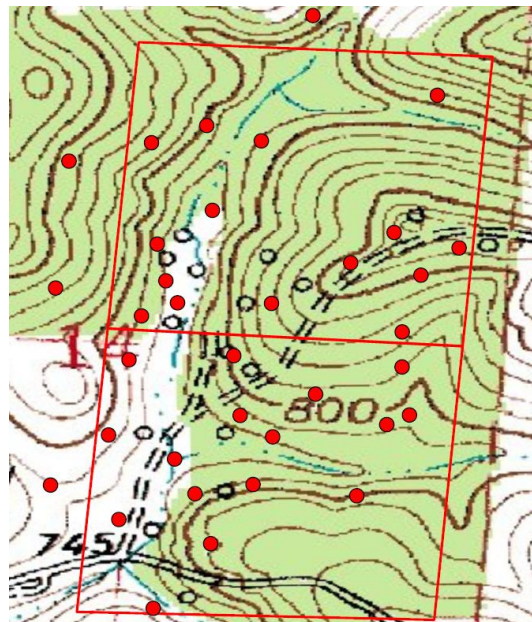


Figure 3: USGS Map with overlay of AIM Database showing existing oil and gas wells

Formation. The coal seam has an approximate top elevation of 660 feet MSL on the western boundary of the westernmost proposed lease tract (X41) and dips to the east. It averages 4.4 feet in thickness. According to an isopach map of cover or overburden thickness above the coal seam provided in Appendix C of the Addendum (Linn Engineering 2012a), overburden ranges from a maximum of approximately 400 feet at a topographic high point near the northeast corner of proposed lease tract X37 to a minimum of approximately 85 feet in a small valley near the southwest corner of proposed lease tract X41. The estimated average overburden thickness over all of the proposed lease tracts is 323 feet.

Relevant Area Geological and Hydrogeological Characteristics

The general geology and hydrogeology of the bedrock of the WNF is described in an internal USFS white paper providing a conceptual model of the groundwater characteristics of the WNF (Thompson 2012). Nothing was found that would indicate that the hydrogeology of the proposed Federal coal lease tracts deviates from that conceptual model. The essential points of that model as they apply here can be summarized as follows:

- The bedrock consists of cyclic, nearly horizontal beds of principally sandstone, siltstone, and shale with minor beds of limestone, coal, and fireclay. Overlying unconsolidated sediments range from weathered bedrock residuum to transported and deposited sand, silt, and clay. Unconsolidated sediment thicknesses vary from absent on some highland areas to over 20 feet along valley wall bases and valley bottoms.
- Overall bedrock permeability or hydraulic conductivity is low. Typical yields of bedrock water supply wells in Perry and Morgan counties are 2 gallons per minute or less even though they are typically open to groundwater inflow over 10's of feet to more than 100 feet of bedrock.
- Bedrock permeability is largely confined to secondary porosity or fractures (primarily joints). Most original primary porosity in the bedrock has been eliminated by cementation of the inter-grain pores.
- The area has undergone little deformation that would create significant zones of fracturing or faulting cutting multiple bedrock units. Fracture occurrence is mostly related to a combination of the regional horizontal stress field and changes in stresses created by erosion and removal of overlying confining strata. Fracture occurrence depends on the physical characteristics of each bedrock type or lithology, and fractures tend not to cut across boundaries between beds of different lithologies. Bedding plane partings or separation may occur between beds of contrasting lithologies. This means that horizontal groundwater flow is usually much higher than vertical flow, and that groundwater flow is often channeled horizontally to nearby surface discharge points.
- Overall groundwater flow is from areas of recharge in the uplands to points and areas of discharge along the valley walls and bottoms. Three flow systems have been identified in the Appalachian Plateau: a local or shallow flow system where flow is from an upland to an adjacent valley, a deeper intermediate system that receives recharge as leakage from local systems over a larger area and discharges to lower elevation valleys of more significant streams and rivers, and a deep system that receives leakage from intermediate systems over an even larger area and discharges to major river valleys. Approximately

99.5 percent of all surface recharge is discharged to adjacent valleys via the local flow system (Callaghan et. al. 1998).

Based on the distance between the coal seam and the ground surface the area of greatest potential concern with respect to possible groundwater impacts is the southwestern portion of proposed lease tract X41. As noted above, this area includes a small valley with two small tributary valleys that have separation distances of 85 to 120 feet between the ground surface and the coal seam. This separation distance includes a variable thickness of unconsolidated valley fill sediments that likely does not exceed 23 feet as indicated by the log for a borehole (BOA-154-C) completed approximately 250 feet down valley of the tract boundary (Linn Engineering, 2011).

There currently is little information on the existence or nature of a shallow, groundwater flow system beneath tract X41. The valleys on tract X41 are occupied by ephemeral streams which indicate a potentially limited shallow groundwater system. The streams are supplied by intermittent surface runoff and possibly intermittent groundwater discharge. Groundwater discharge, if it exists, may be from either seasonal or intermittent discharge of a persistent shallow groundwater system that occasionally rises to the ground surface; surface discharge of intermittent groundwater flow through surficial materials; or some combination of both.

A review of the Ohio Department of Natural Resources' (ODNR's) well log search site (ODNR 2012b) found no listed water supply well logs in the area of the proposed lease tracts that might be used to infer groundwater conditions beneath the tracts. Reviews of the limited number of available well logs for the larger surrounding area show there are no consistent groundwater conditions suggestive of well-defined and predictable aquifers. Reported static water levels range from 15 to 84 feet below ground surface (bgs) with no apparent correlations with elevation. Reported well yields range from 1 to 11 gallons per minute, with most towards the low end. Reported well depths range from 50 to more than 150 feet bgs. Reported aquifer lithologies include sandstone, limestone, and shale. This information is consistent with information compiled on groundwater conditions for the general area of the WNF (Thompson, 2012). In summary, area groundwater appears to be highly limited and variable in occurrence. It is likely individual occurrences of groundwater are poorly connected and that horizontal and vertical transmission of groundwater is limited. Most supply wells have open production zones extending over several 10's of feet to more than 100 feet indicating they have to collect water over a wide depth range to achieve even a minimally acceptable production rate.

Proposed Action

Relevant Mine Plan Features

The mine will be extended from existing mine entryways located to the west and south of the proposed lease tracts. Based on a review of the lease application and addendum (Linn Engineering 2011 and 2012a) it is understood there are no surface entries or other mining-related surface structures or activities planned for the proposed lease tracts. All mining will take place at elevations below the lowest surface elevation of the lease tracts.

According to the lease application and addendum, mining will be performed using room and pillar mining with no mining of pillars upon retreat (i.e. the pillars will be left in place as is and not mined for additional coal as the company withdraws from the mine). Pillars are rectangular

columns of coal left in place for roof support. Rooms will have widths of approximately 18 feet and pillars will have widths of approximately 32 feet. The entry or mine height will be approximately 5.8 feet. To help stabilize the mine roof, initial plans include roof bolting with 60 to 72 inch roof bolts connected to 12 inch plates.

The lease application addendum (Linn Engineering 2012a) states the adequacy of the planned room and pillar design to prevent pillar squeezes and pillar collapse that would result in mine collapse and subsidence was evaluated using the Analysis of Retreat Mining Pillar Stability (ARMPS) computer program. This program was developed by the National Institute of Occupational Safety and Health (NIOSH). This program calculates a Stability Factor (SF) to assess the potential for pillar failure. The Addendum points out that a minimum acceptable SF is 1.5 and that the calculated SF for the proposed mine design are greater than 2 (2.15 for the area of maximum cover and 9.76 for the area of minimum cover) indicating the proposed design should prevent pillar failure and mine subsidence.

Procedures for locating producing, orphan or abandoned wells include reviewing topographical maps and aerial photographs for indications of current or historical wells (Orwan 2012a). If former oil and gas activity in an area is suspected, field surveys are conducted with metal detectors to locate well boreholes (Orwan 2012a). The lease application addendum provides procedures for mining in the vicinity of oil and gas wells. Known oil and gas wells will be isolated by leaving an unmined pillar of coal around them. As required by Mine Safety and Health Administration (MSHA) regulations, known wells with verified field locations will have an isolation radius of 50 feet, and known wells with unverified field locations will have an isolation radius of 150 feet. Wells that are encountered during mining will be plugged according to State of Ohio regulations.

The lease application addendum (Linn Engineering 2012a) states water discharged from the mine will be pumped to an existing washplant or sediment pond for treatment to effluent limitation standards, and then discharged off site. According to communications with the WNF (Orwan 2012a) the mining company expects “very little” (“maybe 50 gallons per minute”) water inflow into the mined area. Completed mine areas will be sealed off.

Potential Direct and Indirect Impacts to Groundwater

Underground mining could potentially impact groundwater in three ways:

1. Collapse of the mine roof and subsidence of the overlying strata could create extensive fracturing altering groundwater storage and flow paths. This could reduce flow to surface discharge points (springs, seeps) supporting surface water bodies as well as plants, animals, and people reliant on water from those discharges. It could also alter flow to water supply wells decreasing their productivity.
2. Even without collapse and subsidence mining could potentially create zones of weakness and enhanced fracturing in overlying bedrock having similar, albeit, less significant impacts on groundwater storage and flow paths.
3. The mine could expose groundwater to conditions that would increase its acidity and metals content. This groundwater could then be discharged at the surface somewhere as acid mine drainage (AMD).

The potential for each of the above risks related to the proposed mining was reviewed with respect to the proposed mining plan; the general topographic, geologic and hydrogeologic characteristics of the area; and readily available research on the potential impacts of coal mining on groundwater.

Proposed Action

Subsidence Related Risk

Mine collapse and subsidence of the overlying overburden can have significant impacts on groundwater conditions. Complete collapse with subsidence extending all the way to the land surface completely disrupts overlying water bearing zones and groundwater flow paths. Collapse increases the fracture porosity of the overburden and may divert overlying groundwater flow into the mine. If this flow is able to find a discharge point from the mine, a permanently lower water table will be established in the area of the collapse, which may drain overlying or nearby wells, springs, streams, and other groundwater receptors. Observations of water levels following mining-induced collapse indicate that groundwater will not necessarily be permanently altered (Stoner 1983). It is possible groundwater levels may recover to something approximating the original water table. However, if the overlying water bearing zones were previously perched or isolated the upper zones may still be permanently drained.

Depending on the size of the mine entry and the nature and thickness of the overburden, the collapse may not extend to the surface. As the overburden subsides into the mine the broken rock effectively fills a larger volume than before which is known as the swell factor of rock. This can leave a layer of essentially un-deformed rock above. However, stresses can be transmitted through that layer creating fractures in the overlying overburden underlying the surface. Subsidence in room and pillar mines only occurs when the pillars fail. It is therefore necessary to evaluate the risk of pillar failure, which causes subsidence. These fractures can impact shallow groundwater flow, including potentially altering groundwater discharge to surface water bodies (see Figure 4 below, from Booth 1986).

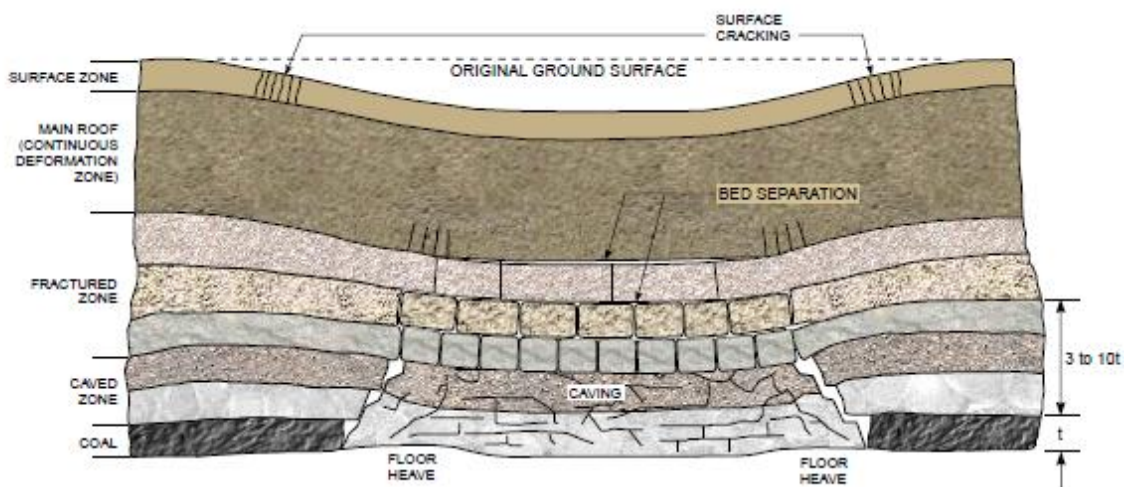


Figure 4: Strata Deformation caused by Pillar failure in a Room and Pillar mine (from MSHA 2009)

As described above, the Lease Application Addendum (Linn Engineering 2012a) use the ARMPS computer software to calculate SFs for the planned mine design. The calculated SFs of 2.15 for the area of maximum overburden and 9.76 for the area of minimum overburden exceed a minimum acceptable SF of 1.5. This minimum acceptable SF of 1.5 is confirmed by the developer of the ARMPS software, Mark and Chase (1997). Mark and Chase (1997) also indicate that massive collapses of coal mines have occurred when pillars with (pillar) width to (entry) height ratios of less than 3.0 were left behind. The pillar width to height ratio for the proposed mine is 32/5.8 or >5.0 suggesting a low risk of collapse. The Bureau of Land Management has reviewed the analyses presented in the Lease Application and performed independent calculations that confirm the results.

Therefore, the potential for mining induced subsidence appears to be low, and impacts to groundwater from subsidence appear unlikely.

Enhanced Fracturing and Altered Groundwater Flowpath Risk

Even without subsidence, the creation of a mine entry redistributes stress in the overlying strata. These altered stresses may open some pre-existing fractures, close others, and create new ones. Depending on the locations of these fractures water flow pathways could be altered. These effects are not a given, nor can they be predicted and from the given information and the prior groundwater analysis it is highly improbable.

The altered fracture porosity may not necessarily create new flow pathways and pre-existing groundwater conditions may remain essentially unchanged after mining is completed. The extent and nature of these effects depend on principally the size and geometry of the mine entries, the nature of the overburden, and the distance between overlying groundwater zones and the zone of altered stress.

However, impacts to shallow groundwater zones are unlikely unless the overlying overburden is unusually thin, weak, or porous (Booth 1986). When room and pillar mining is conducted in order to avoid subsidence, the zone of altered stress will likely only extend a few 10's of feet into the overlying strata. Massive sandstone layers tend to resist fracturing and help protect overlying strata from fracturing. Shale layers are less likely to contain fractures than coarser grained layers of equivalent thickness and therefore are more likely to impede groundwater flow.

Based on an evaluation of potential risks to shallow groundwater and surface water flow from mining, a potential risk to water has been identified beneath the area of a small valley on tract X41. While it is possible this risk does not exist, insufficient information was found to eliminate. It is recommended this area be designated an area of no mining. The area of no mining would be defined by the 120 foot contour as shown on Figure 5, which is based on the isopach map of

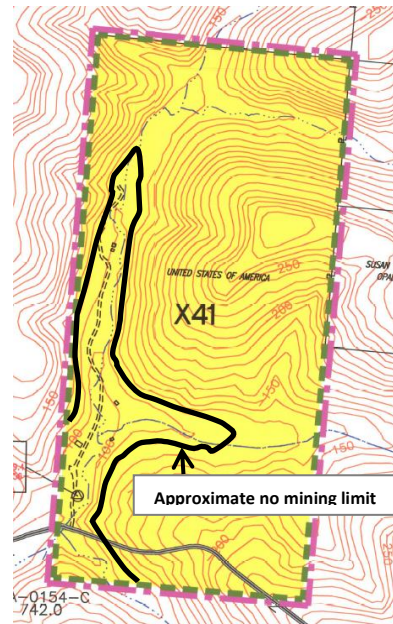


Figure 5: Approximate extent of no mining area

cover provided in Appendix C of the Application Addendum (Linn Engineering 2012a). The choice of the 120 foot contour is consistent with independent calculations performed by the BLM.

Acid-Mine Drainage Generation Risk

Historical underground coal mining within the WNF has been a persistent source of AMD that has impaired water resources of the forest. Several of the old mines have captured infiltrating water and rechanneled it to discharge points. In the process of rechanneling the water it has often been exposed to a combination of sulfide minerals (primarily pyrite) a mineral present in the coal seams and shales. The combination of oxygen and these minerals have chemically formed acidic waters. One possible risk that was considered is whether or not mining beneath the added parcels create similar conditions leading to surface discharges of AMD.

Based on a simple evaluation of mine elevation versus lease tract surface elevation there is no risk for the proposed mine workings to passively discharge AMD onto the proposed lease tracts because the surface of all lease tracts would be well above the mine.

There is a slight risk that the addition of these parcels could intercept water infiltrating from the surface of the tracts and create additional AMD beyond what might be created if those tracts were not mined. The lands represented in this proposal represent less than 4% of the total ongoing mine operations in this area and the incremental increase in AMD generation would be relatively small.

According to the Application Addendum (Linn Engineering 2012a) each section of the mine will be sealed off after mining is completed, which should limit movement of minor accumulated water. The coal company estimates “minimal water problems” based on the borehole logs and current experience with mining in the area. While they do not provide additional information to support this assertion, it is consistent with known AMD generation in the area and the nature of groundwater flow in these types of materials. A significant difference between the coal parcels proposed for leasing and coal that is known to be producing AMD elsewhere in Ohio is the difference in the stratigraphic placement and depth of the coal relative to likely groundwater flow. Historical mines responsible for AMD generation are typically located beneath the highland areas that separate adjacent valleys. The coal seam in these mines have no stratigraphic (depth) separation between the coal and the water bearing layers that discharge to the adjacent valleys. This allows them to capture groundwater recharge and discharge it to the adjacent valleys as AMD. The coal proposed for leasing is located beneath the ground surface (approximately 85-400 feet below ground surface) and the shallow groundwater flow system. As noted in the Relevant Topographic and Surface Features section, only about 0.5% of groundwater in the shallow flow system drains to underlying bedrock (Callaghan et. al. 1998). A comparison of the project mine extent (Extraction Projection Map, Appendix B, Application Addendum (Linn Engineering 2012a)) with ground surface elevations indicates the coal seam to be mined, and therefore the entire area to be mined, is located below the ground surface eliminating the potential for natural surface discharge of AMD.

Therefore, the risk of mining of the proposed lease tracks to generate AMD does not appear to be significant.

No Action Alternative

In the no action alternative, mining would not occur beneath any of the Federal mineral tracts, although it would still be completed beneath the surrounding parcels. In that case the coal beneath the Federal lease tracts would be left behind and become uneconomical to recover, and any potential impacts to groundwater and related surface water from mining of that coal would be eliminated. While potential impacts to groundwater beneath the Federal tracts from mining outside those tracts were not specifically reviewed, the results of the above analyses imply there would be no foreseeable impacts to groundwater from choosing not to allow mining beneath the Federal tracts under this alternative.

Potential Cumulative Impacts to Groundwater

The drainage areas or watersheds overlying the proposed lease area are defined as the cumulative effects area for groundwater. Extending the cumulative effects area to other watersheds would not be relevant to evaluating cumulative effects on groundwater as each shallow groundwater flow system in the area of the project is controlled by, and limited to the extent of the overlying surface watershed (Thompson, 2012). In addition, surface flows that might be supported by groundwater discharge in all of these watersheds are intermittent indicating they contribute little discharge to downstream drainage areas.

The potential for former or existing activities within the watersheds overlying the proposed mine areas to have impacts that could combine with those of the proposed mine were considered. The significant activities in the area with a potential to impact groundwater are mining and oil and gas activity. The remaining activities are associated with recreation and isolated, single family homes. According to the ODNR's Abandoned Underground Mine Locator, there are no pre-existing underground mines in or adjacent to any of the proposed lease tract watersheds (ODNR 2012c). Therefore, effects on groundwater from pre-existing mining, including AMD, are not factors of concern in the cumulative effects area. There are oil and gas wells in the area of proposed lease tracts. However, no impacts to groundwater from the proposed mining were identified in the vicinity of these wells.

Under the proposed lease tract area, no impacts to groundwater have been identified that could combine with impacts from other projects to cause cumulative effects. Consequently, no cumulative effects to groundwater resources are anticipated.

Within the lease tract area, no direct or indirect impacts to the groundwater regime or springs within the project area have been identified, and no cumulative effects are anticipated.

Summary

No significant risks to groundwater from potential mine subsidence or AMD generation were identified. Possible risks to groundwater were identified in the area of proposed lease tract X41 where some valley floors would come to within 85 feet of the proposed mine. There is a low, but non-zero risk that mining induced stresses in the overburden could alter the flowpaths of shallow groundwater beneath these valleys potentially effecting overlying streams dependent on groundwater discharge. It is recommended that mining in this area be avoided wherever

overburden would be less than 120 feet thick. However, no additional requirements beyond those already proposed to minimize this risk are recommended. It should be noted that application of the criteria for avoiding oil and gas well damage will preclude mining in the same area where mining is not recommended due to thin overburden.

Mitigation Measure/Stipulation

Mining should be avoided in areas where overburden is less than 120 feet thick. According to isopach maps, this would only be in the drainages within tract x41.

Surface Water

Figure 7. Sunday Creek watershed (5th Level HUC) with associated sub-watersheds.

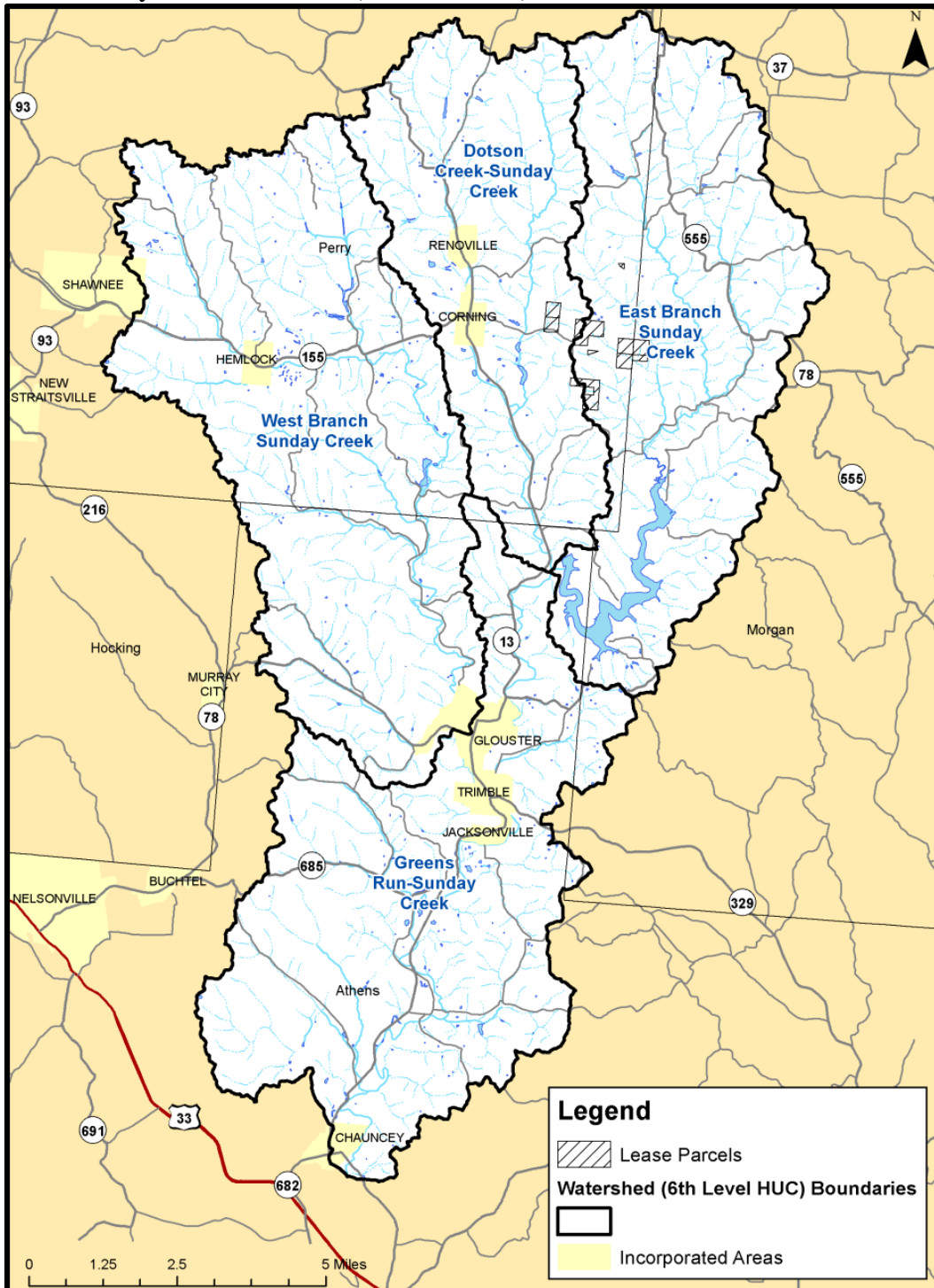


Figure 8. – Abandoned Underground and Surface Mines

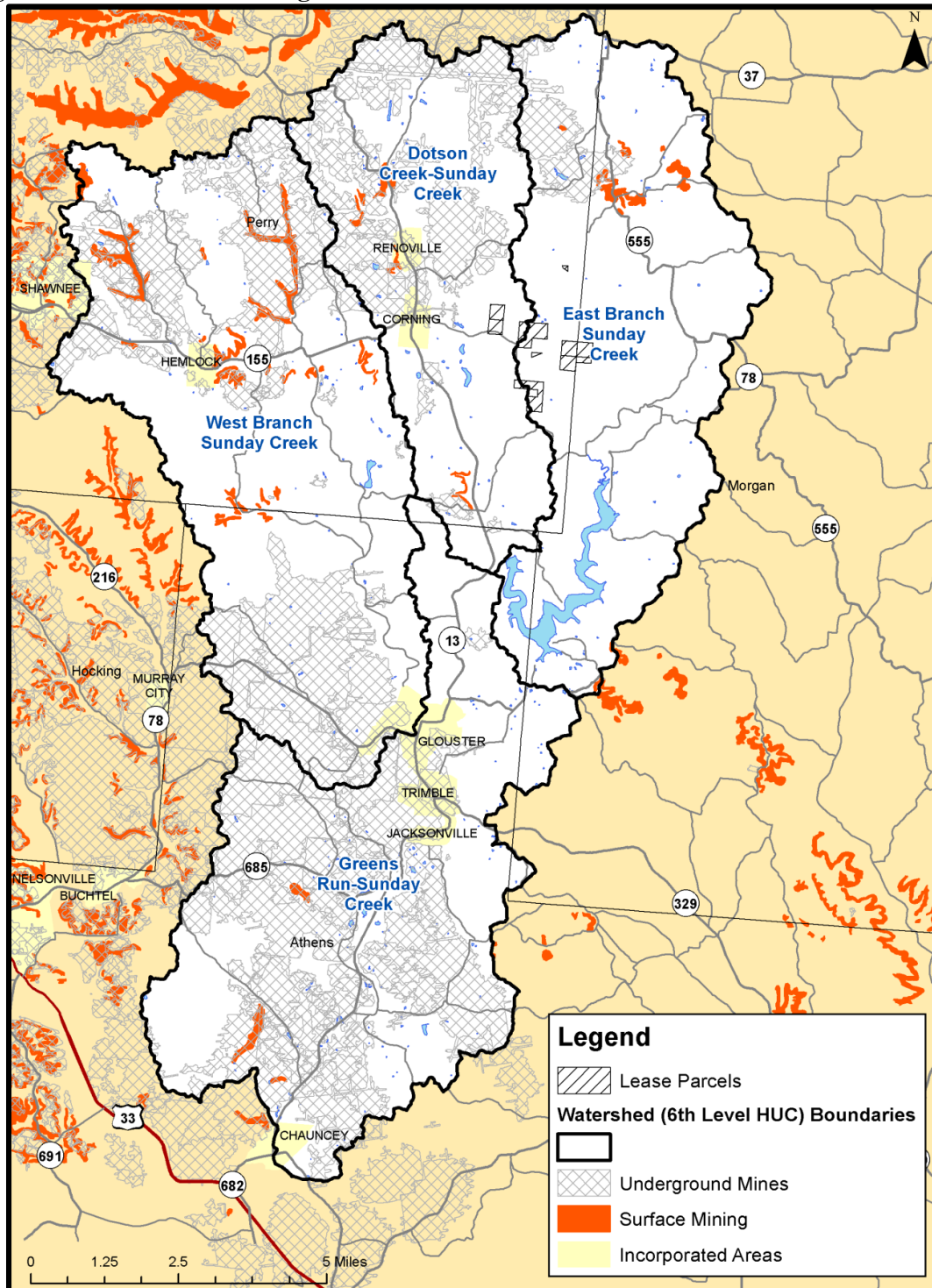
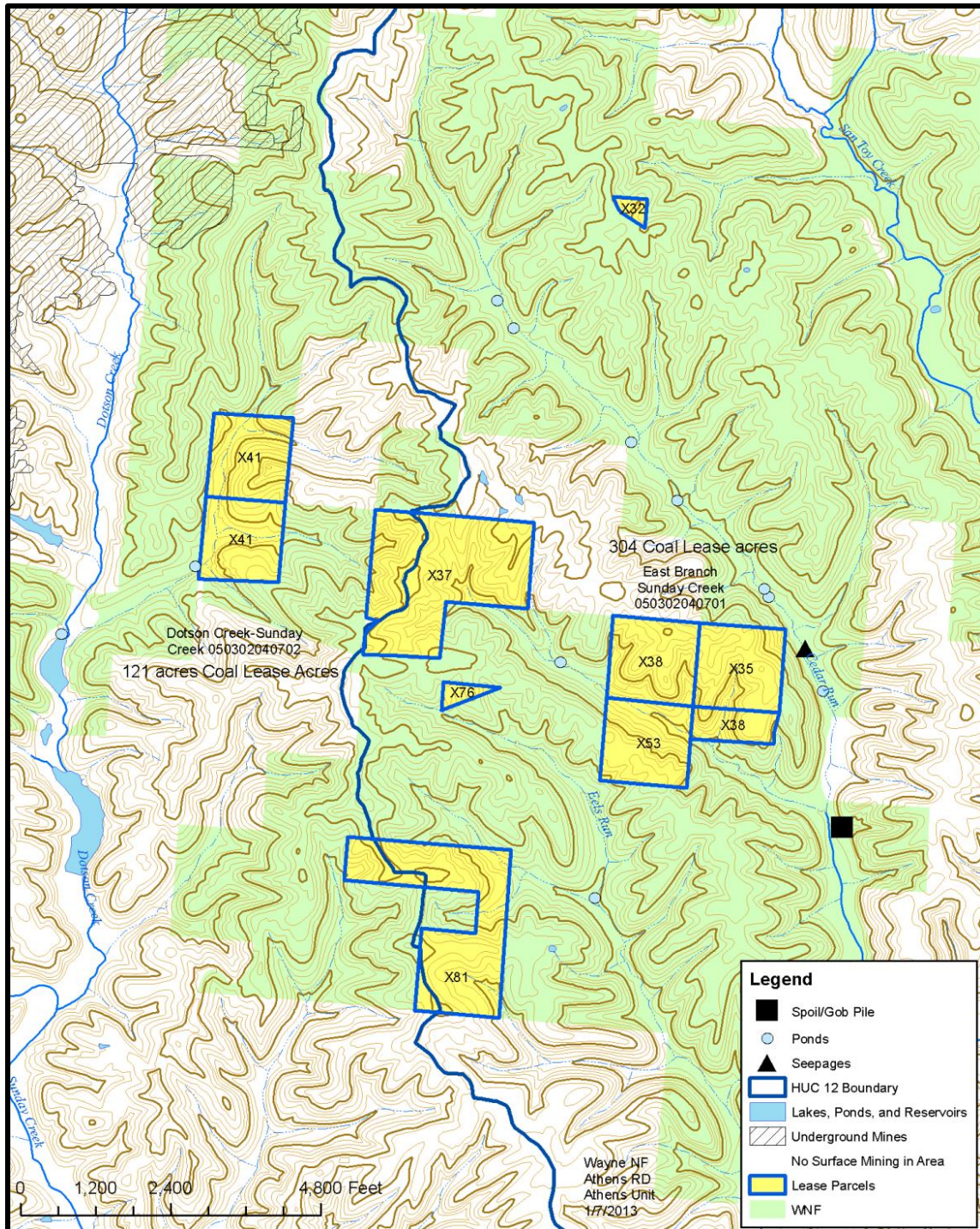


Figure 9. – Proposed Coal Lease Hydrologic & Mining Features Dotson Creek & East Branch sub-watersheds (6th Level HUCs)



Affected Environment

The affected environment description area includes the entire 5th level Sunday Creek watershed (a 5th level hydrologic unit code or HUC) (Figure 7). Figure 8 shows the underground and surface mined areas in the watershed. Figure 9 shows the lease parcels are located in two sub-watersheds of Sunday Creek; Dotson Creek and East Branch (6th level HUCs) (Figure 9). The effects analysis area focuses on the two sub-watersheds containing the proposed lease parcels. The reason the affected environment is described at a different scale than the effects analysis is because the readily available information on the existing condition is described for the watershed at the 5th level HUC which is a larger area than a 6th level HUC. The project area is comprised of seven separate tracts (Figure 9). The majority of the acreage is located in the East Branch watershed (050302040701), with the remaining acreage in the Dotson Creek watershed (050302040702). No mining occurred on any of the 432.54 acres proposed for mining (Figure 9).

The following information is taken directly from the Acid Mine Drainage Abatement and Treatment (AMDAT) Plan for the Sunday Creek Watershed (SCWG 2003). The AMDAT plan has a vast amount of information and characterization of the watershed.

Physiographic Region

“The Sunday Creek Watershed lies in the un-glaciated hills of Southeastern Ohio. It originates in the southern portion of Perry County, and drains into the Hocking River in Athens County. The watershed is located in the Shawnee-Mississippian and Marietta Plateaus of the Allegheny Plateau region. Located in the Appalachian foothills, the Sunday Creek Watershed consists of 88,775 acres. There are eight main tributaries of Sunday Creek: West Branch, East Branch, Big Bailey Run, Jackson Run, Greens Run, Congress Run, Dotson Creek, and Eighteen Run. There are a total of 14 named tributaries in the watershed and the entire watershed drains 139 square miles.” (SCWG 2003, pg 1)

Land Use Characterization

“Much of the Sunday Creek Watershed lies within the coalfields of southeast Ohio. Seventy-eight percent of the watershed is mixed mesophytic forests, which consist of a diverse composition of tree species. The woody vegetation includes such species as beech, silver and red maple, white, red, and chestnut oak, and tuliptree. Other land cover categories include agriculture (17%), brush (2.4%), urban (1%), barren (mines, quarries, sand/gravel pits) (0.3%), and non-forested wetland (0.2%).” (SCWG2003, pg 2)

Coal Mining History of Athens, Perry and Morgan Counties

“Although there was no mining in the proposed project area, considerable mining, both underground and surface, took place throughout the watershed. The two main seams of coal that are mined in the Sunday Creek basin are the Middle Kittanning (# 6) and the Upper Freeport (# 7). The Middle Kittanning seam is the deeper, more economical, and more commonly mined of the two.” (SCWG 2003, pg 3)

“Historically, subsurface and surface mining has occurred in many townships in the watershed. Coal mining has occurred in approximately 39% of the Sunday Creek basin. Today, small strip mines and deep mines continue to operate. Ninety-five percent of the coal is extracted with the aid of a piece of underground machinery called the “continuous miner” The remaining five percent is from strip mining.” (SCWG 2003, pg 3)

“Mining impacts are widespread and occur in some form in most areas. The most heavily mined areas are the north and northwest section of the West Branch, the upper portion of Sunday Creek, the middle section around Glouster, and the southwestern and southern portions of the watershed. Areas where little mining occurred or mining impacts are less severe include the East Branch sub-watershed and the eastern to southeastern section of the watershed. The impacts from abandoned mine lands on water quality include acid mine drainage, gob/refuse piles, and subsidence holes which capture clean surface water into abandoned mines.” (SCWG 2003, pg 3)

Water Quality Designations

General Description of Water Quality Designations

There are a number of measures the Ohio Environmental Protection Agency (OEPA) undertakes in order to quantify and improve water quality in Ohio waterways. Those that are relevant to this project include “Designated Aquatic Life Uses”, listing of impairments, and development of Total Maximum Daily Loads (TMDLs). These parameters are required as part of the Federal Water Pollution Control Act (aka the Clean Water Act), and the OEPA has jurisdiction to oversee the program.

“Designated Aquatic Life Uses” is a classification system using the biological integrity of the stream to classify the health of a stream segment. The contaminants that are affecting the biological health of the stream are then identified and targeted for mitigation through 303(d) listings and TMDLs so the stream can achieve the highest “designated use” attainment possible. The five designated uses consist of:

- “Exceptional Warmwater Habitat (EWH) is the most biologically productive environment. These waters support “unusual and exceptional” assemblages of aquatic organisms, which are characterized by a high diversity of species, particularly those that are highly intolerant and/or rare, threatened, endangered, or special status. This use designation represents a protection goal for water resource management efforts dealing with Ohio’s best water resources.” (SCWG 2003, pg 6)
- “Warmwater Habitat (WWH) defines the ‘typical’ warm water assemblage of aquatic organisms of Ohio streams. It is the principal restoration target for the majority of water resource management efforts in Ohio.” (SCWG 2003, pg 6)
- “Modified Warmwater Habitat (MWH) applies to streams with extensive and irretrievable physical habitat modifications, for which the biological criteria for warm water habitat are not attainable. The activities contributing to the modified warm water habitat designation have been sanctioned and permitted by state or federal law. The representative assemblages are generally composed of species that are tolerant to

low dissolved oxygen, silt, nutrient enrichment, and poor habitat quality. The category applies to dammed or channelized rivers, and can also be applied to streams affected by AMD.” (SCWG 2003, pg 6)

- “Limited Resource Water (LRW) applies to small streams (usually <3 square mile drainage area) and other water courses which have been irretrievably altered to the extent that no appreciable assemblage of aquatic life can be supported; such waterways generally include small streams in extensively urbanized areas, those which lie in watersheds with extensive drainage modifications, those which completely lack water on a recurring annual basis, or other irretrievably altered waterways.” (SCWG 2003, pg 6)
- “Coldwater Habitat (CWH) - this use designation is intended for waters which support assemblages of cold water organisms and/or those which are stocked with salmonids with the intent of providing a put-and-take fishery on a year round basis which is further sanctioned by the Ohio DNR, Division of Wildlife; this use should not be confused with the Seasonal Salmonid Habitat (SSH) use which applies to the Lake Erie tributaries which support periodic “runs” of salmonids during the spring, summer, and/or fall. No specific biological criteria have been developed for the CWH use although the WWH biocriteria are viewed as attainable for CWH designated streams.” (SCWG 2003, pg 6)

Once the designated use is determined, the CWA Section 303(d) requires States, Territories and authorized Tribes to list and prioritize waters for which technology-based limits alone do not ensure attainment of water quality standards. (Technology-based limits are intended to represent the greatest pollutant reductions that are economically achievable for an industry. To develop these technology-based regulations, EPA first gathers information on the industry's practices; characteristics of discharges (stormwater flows and pollutants); technologies or practices used to prevent or treat the discharge; and economic characteristics. EPA identifies the best available technology that is economically achievable for that industry and sets regulatory requirements based on the performance of that technology. The development of these regulations/standards are quite complex. The regulations are converted to standards for industry. The standards are then incorporated into National Pollutant Discharge Elimination System (NPDES) permits issued by States and EPA regional offices. As stated earlier, the methodology that the EPA uses in determining these regulatory requirements is very cumbersome, complex and is performed in a series of various steps. The process is too complicated to describe here. However, in-depth details into the development of these technology-based limits can be found at the following website. <http://water.epa.gov/scitech/wastetech/guide/questions>). Lists of these waters (303(d)) are made available to the public and submitted to the US EPA in even-numbered years. The CWA and US EPA regulations require that TMDLs be developed for all waters on the 303(d) lists.

In the simplest terms, a TMDL can be thought of as a cleanup plan for a watershed that is not meeting water quality standards. A TMDL is defined as a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards and an allocation of that quantity among the sources of the pollutant. Ultimately, the goal of Ohio's TMDL process is full attainment of Water Quality Standards (WQS), which would subsequently lead to the removal of the water bodies from the 303(d) list.

Project Area Water Quality Designations

Various studies conducted by the OEPA have concluded that portions of Sunday Creek are LRW. According to the 1997 OEPA Non-point Source Hydrologic Unit Water Quality Report the entire mainstem of Sunday Creek and the West Branch were estimated to have an aquatic life use designation of LRW. In the 2000 OEPA 305(b) report that characterizes water quality problems in watersheds, the mainstem of Sunday Creek from Glouster to the mouth was LRW. Coal mining (surface and underground) was listed as the known or suspected cause.

In 2001, the OEPA conducted a TMDL study on the Sunday Creek basin. The objective of this first TMDL study was to identify impaired waters, verify designated uses (or re-designating), establish waste load allocations and ascribe causes and sources of beneficial use impairment. Sixty-eight sample sites were established within the Sunday Creek watershed. Water chemistry and flow data (if possible) were collected at all 68 sites at least once, and designated sites were measured either bi-monthly or monthly. In addition to water chemistry, ambient biology (including fish and macro-invertebrates), qualitative habitat evaluations, sediment chemistry and bacteriological data were collected. Sediment and macro-invertebrate data were only collected at long-term monitoring sites that were already established. Data was collected in three different seasons (spring, summer and fall) during 2001. Exact methods and equipment used is described in detail in Section G, Methodology of the Sunday Creek AMDAT Plan (SCWG 2003).

The study found impairments to the Aquatic Life Habitat and the Recreation uses. The primary causes of impairment were determined to be low pH, habitat and bacteria. The pH is from AMD. Habitat degradation has numerous causes; however, it is often associated with sediment. The most significant sources of bacteria are cattle with direct access to the stream and home sewage. TMDLs were developed for pH, bacteria and habitat (sediment).

While portions of the Sunday Creek watershed are classified as LRW, other areas have much better water quality. The sub-watersheds that were believed to meet the criteria for Warmwater Habitat (WWH) at the time of the 2001 study included an unnamed tributary (RM 8.1), Greens Run, Little Greens Run, Congress Run, Mud Fork, Johnson Run, Indian Run, Pine Run, Bloody Run, Cedar Run and Dotson Creek. Areas sampled that showed no signs of impacts from AMD were Cedar Run, San Toy Creek, East Branch, Johnson Run, Indian Run, Hemlock Run, Eighteen Run and Dotson Creek (note the two sub-watersheds that contain the proposed lease parcels).

Sunday Creek's ecological integrity is not only affected by contamination in the water column. Sediment toxicity and problems associated with sedimentation from AMD sources correlate with poor biological health. Sediment is pervasive in areas where abandoned gob or coal waste spoil piles exist. These coal waste piles are usually un-vegetated and during rainfall events produce large amounts of sedimentation in streambeds. Sediment levels do not necessarily correspond with water column levels. Metal precipitation is based on pH levels, and sites with better water chemistry may in fact have higher levels of contaminated sediments.

In August of 2005, the OEPA conducted a second TMDL study. The OEPA identified the Sunday Creek watershed as an impaired water on the 1998, 2002, and 2004 303(d) lists. The causes listed in the 2004 Integrated Report are metals, pH, siltation and flow alteration. The sources for the first three causes are surface mining and acid mine drainage. Flow alteration is related to a major impoundment on East Fork; this "cause" is described in this report but not

addressed as a TMDL issue. (OEPA 2005, pg 1). This report can be located at: http://www.epa.ohio.gov/portals/35/tmdl/SundayCreekTMDL_aug05.pdf

The 2005 TMDL study summarized the water quality and habitat conditions of the Sunday Creek watershed, quantitatively assessed the factors causing the impairment, provided for tangible actions to restore and maintain the streams, and specified monitoring to ensure actions are carried out and to measure the success of the actions taken. Table 1 below summarizes the impairments addressed and TMDLs included in this report (OEPA 2005, pg 4). The two watersheds that encompass the project area are highlighted in red.

Potential Direct and Indirect Impacts

Proposed Action

The primary concerns related to water resources received by the Forest during our scoping process to the public were impacts to groundwater, generation of AMD, impacts to surface waters and the occurrence of subsidences and other surface expressions of underground mining. This report focuses on surface waters and subsidence and other surface expressions. The groundwater and acid mine drainage issues are addressed in detail in the groundwater analysis section of this Environmental Assessment.

The groundwater review concluded that “no significant risks to groundwater from potential mine subsidence were identified” and “there is no risk for the proposed mine to discharge AMD onto the proposed lease tracts because the surface of all lease tracts would be well above the mine”. A copy of this detailed review is contained within the project record.

Table 1 is important in that it provides the current condition of the streams in the two watersheds where underground mining is being proposed. The water-bodies listed are on the 303(d) report with the associated impairments. The information in the table also shows that neither of these watersheds are impaired by AMD due to mining. The primary impairment is sedimentation. If the mining company desires to access existing forest service roads in this area for the purpose of any exploratory activities, the cumulative effects of adding more sediment to the streams would require further analysis. However, according to the leasing application and the proposed action, this area will be designated as a No Surface Occupancy (NSO) area, thus no disturbance. Therefore, there are no anticipated impacts to any surface water bodies.

Table 1. Summary of Sunday Creek TMDL Impairments (TMDL 2005, pg 4)

Waterbody [Identification Number]	Impairments	TMDLs in this report?		
		Acidity	Bacteria	Sediment
Sunday Creek (01-200)	1) AMD 2) Upper site interstitial	✓		✓
Sunday Cr Trib II at RM 26.4* (01-207)	1) Interstitial flow (natural) 2) Marginal habitat			
Sunday Cr Trib II at RM 25.44* (01-202)	None			
Eighteen Run (01-256)	1) AMD, relocated channel, draining reclaimed mine lands	✓		
Dotson Creek (01-260)	1) Oil and gas extraction at lower site 2) Upstream impoundments 3) Beaver influence (lower site)			✓
East Branch Sunday Creek (01-250)	1) Reservoir (flow and bottom release) 2) Livestock access (upstream reservoir) 3) Intermittent flow (uppermost site) 4) Modest AMD (up from reservoir)			✓
Eels Run (01-255)	None			
Cedar Run (01-252)	None			
San Toy Creek (01-208)	1) Naturally low gradient swamp/beaver affected stream			✓
Long Run (01-209)	1) Interstitial flow (natural)			
West Branch Sunday Creek (01-240)	1)AMD (severe to moderate)			
West Branch Trib. I at RM 12.41* (01-254)	1) AMD (moderate) 2) Poor habitat	✓		✓
Pine Run (01-344)	1)AMD (severe to moderate, numerous seeps) 2)Interstitial flow (upper reach) 3)Low gradient wetland/beaver influence (natural)	✓		
West Branch Trib II at RM 10.73* (01-247) AKA Congo Run	1)Moderate AMD 2)Low gradient stream (natural)	✓		✓

* RM is short for River Mile

Subsidence is the slumping of the ground surface as a result of underground collapse of the mining structure such as through pillar failure. In room and pillar mining where the pillars are intended to remain after mining, the only way for subsidence to occur is through pillar failure. It is important to design the pillars to the appropriate size in order to reduce the risk of failure and therefore subsidence. The risk of pillar failure increases with increasing overburden, due to the fact that there is a greater load on the pillar with greater depth. Pillars for deeper mines are designed to be bigger and closer spaced in order to withstand the greater load. Conversely, the likelihood that there will be surface expression of collapse decreases with increasing overburden. Thus, if there is an underground collapse of the mining structure, the probability of subsidence (i.e. the slumping of the ground surface) being seen on the surface, decreases with depth.

The BLM independently assessed the pillar dimensions in the lease application to determine their sufficiency in holding the mine roof and preventing collapse. These calculations are contained within the project record. Ultimately, the BLM concluded that the pillars are appropriately sized to maximize extraction while minimizing the risk of pillar failure (Project Record BLM_Evaluation Attachment B). Therefore no subsidence is anticipated.

It is possible to have surface expression of mining that is not caused by pillar failure. This typically happens in areas where there is less overburden. Since these deformations are not caused by pillar failure they are not considered subsidence. Examples of this type of surface disturbance would be stress fractures and stream capture. They typically occur when the mine is relatively shallow and it is therefore possible for the stresses to reach the surface. They can be controlled by creating a minimum depth of cover in order to reduce the risk of their occurrence.

Subsidence and stream capture have been a concern within the region, since historic mines were shallow and utilized wooden pillars, which degraded and failed over time. Figure 10 shows the southeast regional dip of the coal seam, with the coal found in the Monday Creek watershed being much closer to the surface than the coal in the Sunday Creek watershed (Light 2001). Figure 11 shows that there is increased risk of surface expression of pillar failure (i.e. subsidence) when the coal seam is less than 50 feet below the ground surface and that many of those areas occur within the Monday Creek watershed (Light 2001). Figure 12 further displays areas of known stream captures, notably all occurring within the Monday Creek watershed (Light 2001).

As noted in the Groundwater section of this EA, the minimum cover for the seven proposed lease parcels is found near x41 and is approximately 85 feet. The mitigation suggested within the Groundwater section of avoiding mining in areas of less than 120 feet of overburden would also be effective for preventing stream capture, and is thus recommended here as well.

Wastewater Handling

As stated in the likely development scenario, any water encountered in the mine would be pumped to the surface where it may be used to wash the coal. The water is then pumped to a sediment pond (i.e. slurry impoundment) where it is treated as needed before being discharged into an unnamed tributary of Sunday Creek. These activities take place off of the WNF, but are considered here because they are connected to the leasing and potential mining of the seven parcels.

The existing slurry impoundment is permitted with the Ohio Environmental Protection Agency (OEPA). Various types of monitoring are conducted including baseline sampling, surface and

ground water sampling during active mining and point source sampling of a direct discharge from the impoundment (Project Record, Section 06, Permit6 and Permit7). Various parameters are measured at varying frequencies, including acidity, alkalinity, iron, manganese, aluminum, sulfates, mercury, dissolved solids, suspended solids, hardness, flow rates (surface water) and water levels (groundwater) (Project Record, Section 06, Permit6 and Permit7). The integrity of the impoundment is also evaluated on a regular schedule. The permit holder is in full compliance with the permit requirements. (Stachler 2013)

It is important to note that implementing the likely development scenario would not lead to an increase in the rate of mining in the area and so the annual generation of wastes is expected to remain the same. Rather it would constitute a portion of the existing mining and would extend the life of mining by approximately one year. What this means is that it is not expected that the rate of effluent would be increased. It would be maintained at the same rate, but extended for one year. The effluent also would maintain the characteristics currently found during the regular monitoring required by the existing permits. As stated above, the sampling done at the site shows the impoundment to be in compliance with the permit requirements. Implementing the Proposed Action and subsequent mining would continue the current condition into the future and would not lead to any new effects.

No Action Alternative

Mining of adjacent private minerals which surround the proposed Federal lease tracts is likely even if consent to lease the Federal lease tracts is not given. Therefore, the coal underlying the Federal lease tracts would not be mined and would no longer be cost-effective to recover.

Wastewater would continue to be generated due to the mining of privately-owned coal. The duration of wastewater generation would be reduced by approximately one year as compared to the Proposed Action.

Cumulative Effects

The cumulative effects area consists of the sub-watersheds of East Branch and Dotson Creek. This area contains the lease parcels and the existing slurry impoundment. Existing and reasonably foreseeable activities that are relevant to the analysis include past, present and future coal mining, crushing and washing. It is assumed that the rate of mining, crushing and washing the coal would not increase over time; rather the current condition would be maintained for the remainder of activity.

Proposed Action

The only water quality cumulative effects are related to the connected action of wastewater generation. The proposed project would extend the operation of mining and related activities. Wastewater generation, when considered in the context of other existing and reasonably foreseeable activities in the area, would have a minimal cumulative impact. The proposed project would not result in cumulative impacts on an annual basis because an increase in wastewater

generation due to annual operations would not occur. However, a small cumulative impact could occur due to the increase in total wastewater generation over the lifetime of the mine.

No Action Alternative

If the No Action Alternative were selected, it is likely that wastewater generation on an annual basis would remain the same, since the privately-owned coal in the immediate area would still be mined, crushed and washed. Over the long-term, there would be a slight reduction in wastewater generation versus the Proposed Action. This is because if the coal in the seven lease parcels were not available the mining operations would be completed approximately one year before they would be for the Proposed Action.

Conclusion

Based on a thorough review of the most current data available, the likelihood of adverse impacts to surface water bodies are not expected. The data suggests that there is an average of more than 300 feet of overburden throughout the entire project area with the exception of tract X41. The overburden here is about 85 feet. The WNF is proposing that a minimum of 120 feet of overburden be present in order for mining to occur. Isopach maps have indicated this would only be in x41. This issue is discussed in detail in the groundwater section of this Environmental Assessment. Approximately 50-60 percent of the coal is being left in the form of pillars to support the overburden. Based on these factors, the conclusion is that the likelihood of subsidence or stream capture occurring in the project area is highly unlikely and the risk is very low.

If the proposed action changes in any noteworthy manner, further analysis of the effects will be necessary.

Figure 10. Middle Kittanning Coal Floor Elevations – SE Regional Dip (Light 2001)

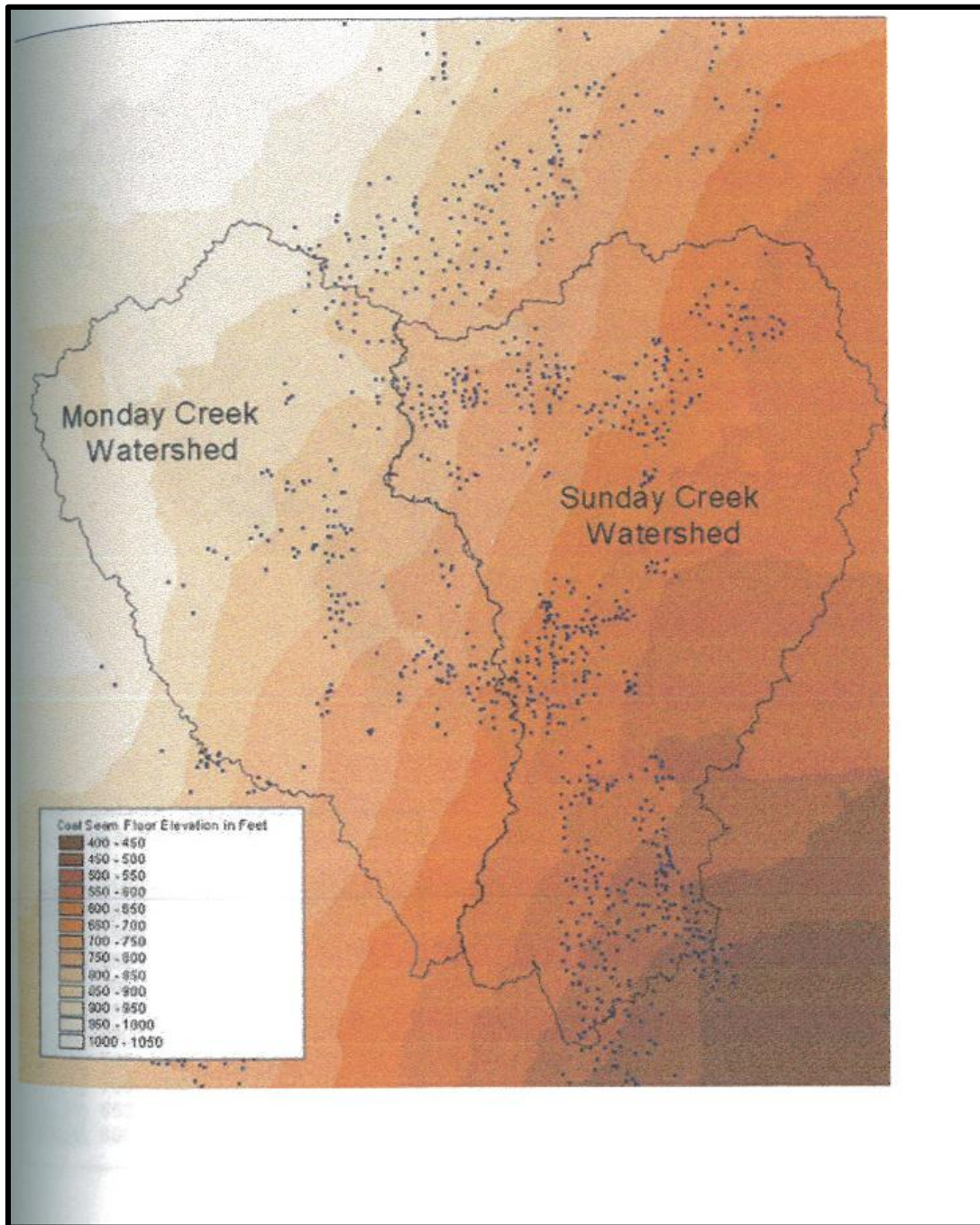


Figure 11. Likelihood of Surface Expression of Pillar Failure (i.e. Subsidence) (Light 2001)

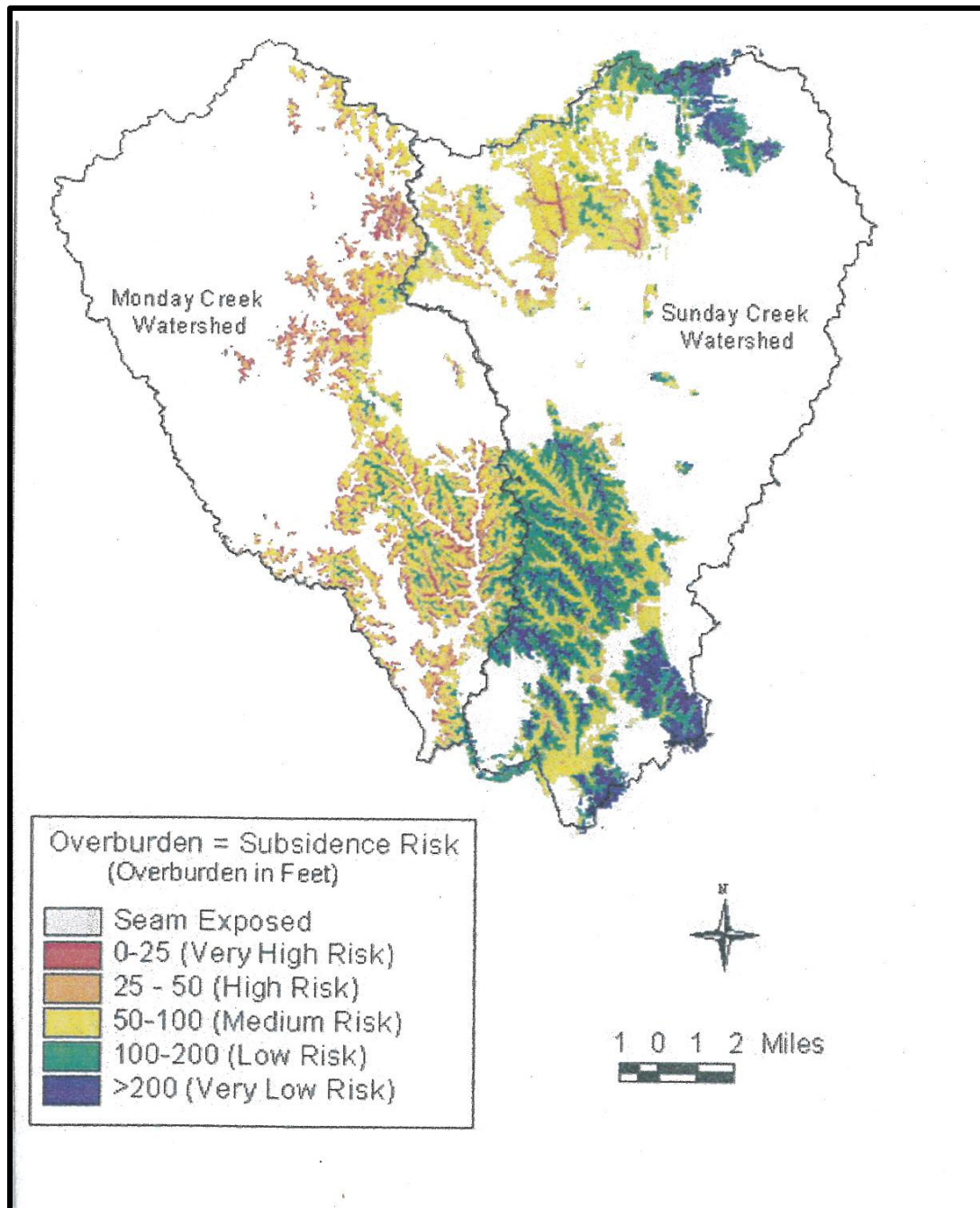
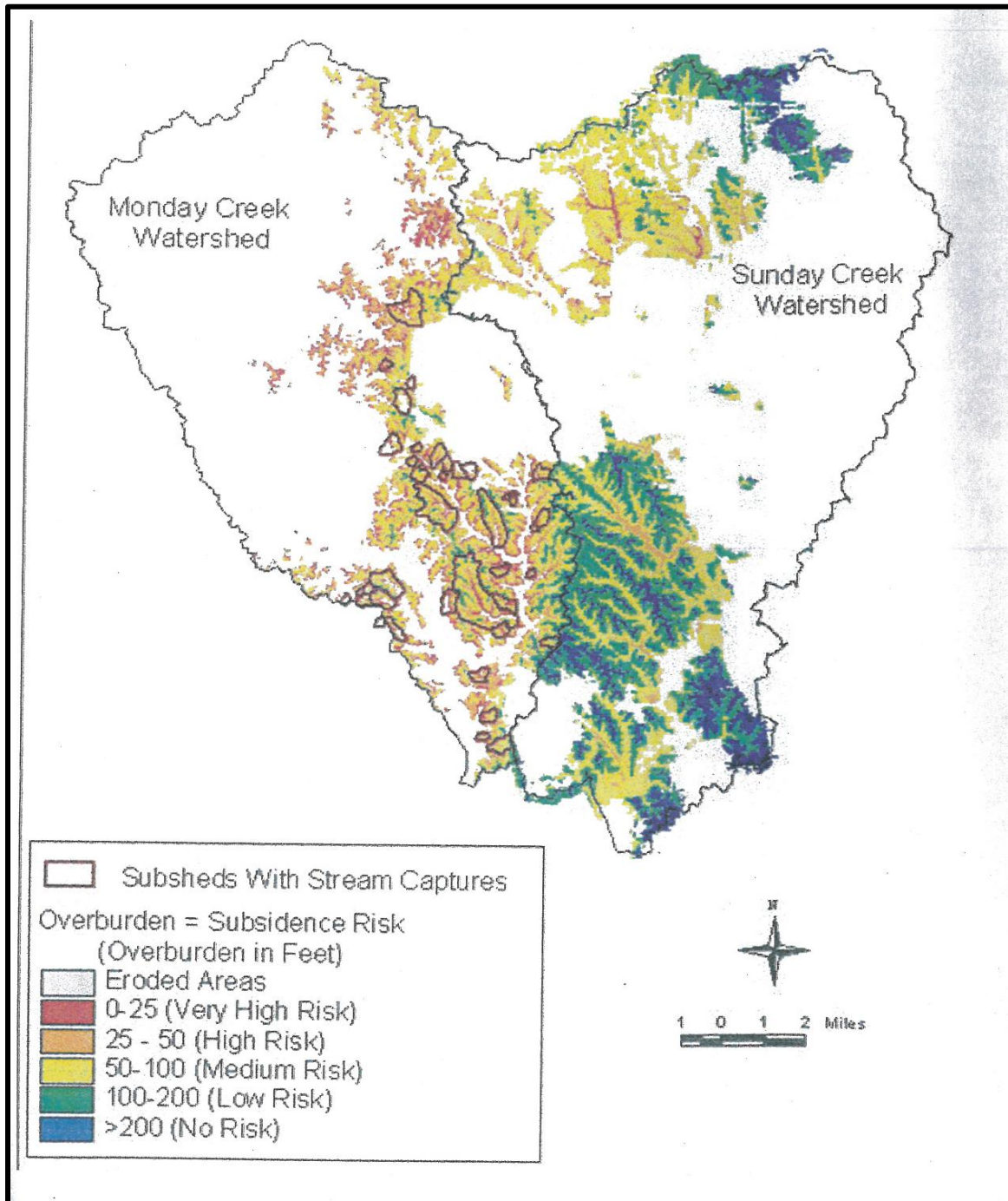


Figure 12. Subsidence Risk Map with Stream Captures (Light 2001)



Greenhouse Gas Emissions

Background

The US Environmental Protection Agency (US EPA) has set national Ambient Air Quality Standards for six substances deemed “criteria” pollutants under the Clean Air Act: carbon monoxide, lead, nitrogen dioxide, particulate matter (10 microns and 2.5 microns), ozone and sulfur dioxide. These pollutants are not carried forth for analysis in this report; rather they are brought up to highlight the non-regulated status of the substances that are of concern for this analysis: methane, carbon dioxide and nitrous oxide. Methane, carbon dioxide and nitrous oxide are the primary greenhouse gasses associated with combustion and underground coal mining. Carbon dioxide and nitrous oxide remain in the atmosphere for long periods of time, and travel long distances. Their effects are widely distributed rather than localized.

The EPA has not established thresholds for regulatory purposes for these substances. On September 22, 2009, the US EPA issued a final regulation (40 CFR 98) for the Mandatory Reporting of Greenhouse Gases, which became effective on October 30, 2009. The rule applies to direct greenhouse gas (GHG) emitters and suppliers (see definition and description of direct emissions from the Greenhouse Gas Protocol found at <http://www.ghgprotocol.org/calculation-tools/faq>). Emissions of these gases are reported as CO₂ – equivalent (CO_{2e}) emissions. The CO_{2e} conversions are based on the global warming potential (greenhouse effect) of the GHG pollutant versus CO₂ and are as follows:

Table 2: GHG Pollutant vs. CO₂

Pollutant	CO ₂ Equivalent Emissions
CO ₂	1
CH ₄	21
N ₂ O	310

In the Final Rule, US EPA promulgated 40 CFR 98 Subpart FF: Underground Coal Mines. Subpart FF requires monitoring and reporting of GHG parameters and emissions for underground coal mines that have direct emissions of 25,000 metric tons CO_{2e} or more in a year combined emissions from stationary fuel combustions units, miscellaneous uses of carbonate and all applicable sources categories identified within that subpart of the regulation (40 CFR 98.2(a)(2)). Required GHG emissions reporting for Subpart FF began in 2012 for calendar year 2011. As of February 11, 2013, the information on underground coal mines has not been made public on the US EPA Greenhouse Gas Program webpage; however, the operator of mines nearby the proposed lease parcels has indicated they are not required to report.

The Council on Environmental Quality (CEQ) issued draft guidance to agencies in October of 2009 regarding consideration of greenhouse gases in NEPA analysis (Sutley 2010). The guidance uses the reporting threshold developed by the US EPA (direct emissions of 25,000 metric tons of CO_{2e} annually) as a minimum threshold for which an effects analysis *may* be useful (emphasis added). The CEQ guidance and the US EPA regulation qualify the suggested minimum threshold by calling it the “direct emissions” of the proposed agency activity. This terminology is taken from the 1997 Kyoto Protocol and the Intergovernmental Panel on Climate Change’s Greenhouse Gas Accounting Protocol, which categorizes emissions as direct (Scope I), indirect (Scope II) or other indirect (Scope III). Scope I emissions occur on the premises of a facility. They include on-site combustion emissions, vented and fugitive emissions, process-related emissions and

emissions from facility vehicles. Scope II emissions occur when a facility purchases or imports energy from sources located off-site (e.g., steam, heat, or electricity from the power grid). Scope III emissions include all other sources for which an organization chooses to account. Emissions relating to the use of a sold product (i.e. the burning of coal to produce electricity) are considered Scope III emissions. (WBCSD and WRI)

The CEQ draft guidance goes on to detail how an analysis of greenhouse gas emissions might be conducted in agency NEPA processes when appropriate. CEQ states that it's appropriate for an agency to quantify emissions from the project, discuss measures to reduce emissions and discuss the link between the anticipated emissions and climate change.

“However, it is not currently useful for the NEPA analysis to attempt to link specific climatological changes, or the environmental impacts thereof, to the particular project or emissions, as such direct linkage is difficult to isolate and to understand. The estimated level of GHG emissions can serve as a reasonable proxy for assessing potential climate change impacts, and provide decision makers and the public with useful information for a reasoned choice among alternatives” (Sutley 2010).

The above approach is the one taken in this resource analysis. Estimated emissions are calculated and disclosed where appropriate and meaningful.

Direct and Indirect Effects of Alternatives

Proposed Action

In implementing the Proposed Action, the Forest Service would consent to the leasing of seven noncontiguous parcels of federally-owned coal and the BLM would then offer those parcels for lease. It is likely that the parcels would subsequently be mined. The likely development scenario is for room and pillar mining to be used, with approximately 40-50% recovery rate, meaning that between 50-60% of the coal would remain in place to support the overburden. There would be no surface activities on the seven parcels.

This method is similar to what is currently being employed in the immediate vicinity of the project area at existing mines. Comparing the total amount of recoverable coal from the seven parcels (Table 3) to the annual production numbers for the existing mines (Table 4) shows that the amount of coal from the seven parcels represents approximately 1 years' worth of minable coal from the #6 mine. For that reason, conditions at the #6 mine will be utilized for the direct and indirect effects analysis.

Table 3: Proposed Lease Parcels Acreage and Coal Tonnage (tons are short tons)

Parcel	Acres	Recoverable Coal (using 45% recovery rate)
X 41	80.0	291,600 tons
X 37	109.35	398,581.20 tons
X 76	10.0	36,450 tons
X 38 and X 53 (Perry County)	80.0	291,600 tons
X 35 and X 38	60.94	222,126.30 tons

(Morgan County)		
X 81	86.25	314,381.25 tons
X 32	6.0	21,870 tons
Totals:	432.54	1,576,609 tons

Table 4: 2011 Production at Adjacent Mining Operations

Mine	2011 Production (ODNR 2012a)
#6 Mine (Middle Kittanning)	1,804,868 tons
#7 Mine (Upper Freeport)	691,291 tons

As indicated in the background section, the primary greenhouse gas concerns with coal mining are methane, carbon dioxide and nitrous oxide. These gases are released to the atmosphere as Scope I emissions from the mining of coal and the usage of diesel/gasoline-powered equipment (diesel/gas-powered equipment is not allowed within mines but operates at the surface).

Methane is created during the process of coal formation and remains stored in the coal seams and surrounding rock layers. Methane is released to the atmosphere when a coal seam is fractured during surface or underground mining. The amount of methane released by mining depends on the carbon content of the coal, the depth of the coal seam (deeper seams generally contain more methane), and the type of mining being conducted. Methane emissions are currently not regulated by the EPA; however, they are strictly monitored by the Mining Safety and Health Administration (MSHA). MSHA regulates methane because it is explosive when found in concentrations of 5-15% of total air volume.

All underground mines have ventilation systems that circulate fresh air throughout the workings. The ventilation system includes fans, airways, control devices to direct or restrict air flow, cooling and filtering air and systems for monitoring air quality and quantity. The ventilation system picks up and removes any released methane through the return air.

Currently there are no surface vents: ventilation air is supplied through the mine entrance. At some point in the future they could be needed, but would not be located on these seven parcels. The surface vents would be needed as the active mining progresses further away from the mine entrance and would provide for the influx of fresh air.

Ventilation systems and surface vents can contribute meaningful amounts of methane to the atmosphere if the coal seam contains and releases methane when mined. As mentioned, MSHA requires monitoring of methane to provide for worker safety. In the adjacent mine workings, methane is monitored continuously by the mining company where there is active mining (monitors are attached to mining equipment and cause automatic shut-down if methane levels are at 1%) and on a quarterly basis by MSHA where the return air (ventilation) exits the mine through the main mine entrance (Orwan 2013). The monitors on the mining equipment typically find undetectable levels of methane. Quarterly monitoring data for the #6 mine was obtained from MSHA (Hagedorn, 2013) and show small volumes of methane released through the ventilation system (Project Record and used in Appendix A for methane calculations). Therefore, it is reasonable to conclude that if the seven parcels were mined the release of methane would be

small. **Calculations within Appendix A show that methane emissions would be roughly 16 metric tons per year of CO_{2e}.** Any surface vents that might be needed (and would be located off of the seven parcels) are not anticipated to contribute to emissions since, as mentioned, current air monitoring shows methane levels at undetectable levels.

Any remaining Scope I emissions would be due to running diesel or gasoline powered equipment. The bulk of equipment is electric: There is one diesel-powered 200 horsepower front end loader that operates at the facility (Orwan 2013).

Table 5: Emissions from Combustion Sources at the #6 Mine (all emissions are in units of metric tons/year)

Diesel Equip	Horsepower	CO ₂ emissions	CH ₄ emissions	N ₂ O emissions	CO _{2e} emissions
Front end loader	200	93.0	0.0038	0.00075	93

Combining the Scope I emissions from methane liberation and the Scope I emissions from diesel-powered equipment gives a total of 109 metric tons of CO_{2e} emissions on an annual basis.

As further evidence that the Scope I emissions from the coal mining would be under the 25,000 tons threshold proposed by the CEQ, the mining company currently operating mines in the immediate vicinity of the proposed lease parcels is not required to report greenhouse gas emissions to the US EPA for their Greenhouse Gas Reporting Program. The emissions from the current mining conducted at an annual production rate of 1,804,868 short tons (ODNR 2012a, displayed here in Table 4) do not meet the minimum reporting threshold for US EPA's Greenhouse Gas Reporting Program. This annual production rate is greater than the estimated recoverable coal contained within the seven proposed lease parcels (Table 3), thus it is reasonable to conclude that the mining of these parcels would be under US EPA's reporting and CEQ's proposed analysis threshold.

Scope II and III emissions include the electricity consumption at the mine (Scope II) and the combustion of the coal at a power plant to generate electricity (Scope III).

Electricity used at the mine was obtained for 2012 (Orwan 2013). Because the #6 and #7 mines operate in close vicinity and by the same company, there is a single total kilowatt hour value for total electricity used. Table 6 shows emissions from the combined electricity used at the #6 and #7 mines.

Table 6: Emissions from Combined Electricity Used in #6 and #7 Mines

2012 Electricity Usage in #6 & #7 mines	Ohio Emissions Rate	CO _{2e}
38.6 million Kwh/yr	0.000891 metric ton CO _{2e} /kWh	34,393.660 metric ton/yr

Because the #6 mine produced the approximate value of coal that would be recovered from the proposed lease parcels and because it represents 70% of the total production between mine #6 and

#7 (Table 4), the total CO_{2e} value was multiplied by 70% to get a rough estimate of the electricity emissions that would occur if the proposed lease parcels were mined. **These calculations show that 24,100 metric tons of CO_{2e} emissions would be produced from the electricity used.**

While the final use or destination of the coal mined is not known, because Ohio coal is primarily used to generate electricity it is reasonable to assume that the coal will be sold to a power generation facility. As displayed in Table 3, approximately 1,576,609 tons of coal would be removed from the parcels if leased (assuming a 45% recovery rate). The conversion calculation used to convert tons of coal to metric tons of CO_{2e} is from the US EPA Pollution Prevention Program's GHG Calculator (<http://www.epa.gov/p2/pubs/resources/measurement.html>) and is found in Appendix A. **Approximately 2,987,322 metric tons CO_{2e} would be generated from the burning of the coal to produce electricity.**

It is important to remember that the proposed lease parcels are noncontiguous. They will not all be mined within the same year; therefore, the emissions that are generated from implementing the proposed action and any subsequent mining and coal burning will not be realized in one year. For the sake of comparison, Table 7 shows the emissions from the combustion of coal and the emissions from several nearby power generation facilities.

Table 7: Comparison of Proposed Lease Parcel Coal Burning Emissions to Existing Power Plant Emissions (metric tons CO_{2e})

Facility	Anticipated emissions	2011 emissions
Proposed Lease Parcels	2,987,322	N/A
2 power plants in Gallia Co (USEPAa)	Unknown	24,364,958
3 power plants in Washington Co (USEPAa)	Unknown	7,465,456

Because there is routinely no detectable level of methane in mines in the immediate vicinity of the proposed lease parcels and the ventilation air methane is well below the CEQ proposed threshold, there is no need to apply methane capture, utilization or destruction technologies. The purchase of carbon offset credits would reduce or balance out the net total Scope I, II and III CO_{2e} emissions from implementation of the project and any subsequent mining and coal burning. Because the Scope I, II and III CO_{2e} emissions are considered low at even a local or regional scale, it is unlikely that purchasing offsets would have a measurable impact on global climate change. While the Wayne National Forest and Bureau of Land Management do not have the authority to compel any company that leases the parcels to purchase offsets, the agencies can encourage that company to do so.

The calculations and discussion contained above show that while the proposed action and subsequent coal mining would create Scope I greenhouse gas emissions, they are anticipated to be below the US EPA's mandatory reporting threshold and the CEQ's suggested minimum threshold for NEPA analysis. Scope II and III emissions represent larger amounts of greenhouse gas generation; however, those amounts are still relatively small in comparison to power plants within the region and would be broken down into smaller emission totals on an annual basis, since the coal will not all be mined within the same year.

No Action Alternative

Under the No Action Alternative, WNF would not consent to leasing, and BLM would not offer the lands for lease. Consequently, the coal in the seven parcels would not be mined. The coal required to generate electricity would either be obtained from the adjacent lands, or would be obtained from a mine located elsewhere. Either way, it is likely that the adjacent coal would be mined and the Scope I, II and III emissions would be similar to what is described for the Proposed Action. The estimated Scope I emissions are well below the US EPA's mandatory reporting threshold and the CEQ's suggested minimum threshold for NEPA analysis. Because the coal likely to be mined in the proposed action represents approximately 1 years' worth of mining, the effects of implementing the No Action Alternative are the same as the Proposed Action, other than the duration of effects would be reduced by one year.

If coal is obtained from a different location, the emissions described in the Proposed Action above would occur at that remote located mine for the duration of approximately 1 year. There would be similar emissions generated at this other location for whatever the lifespan of mining those existing coal reserves represents, and is outside of the bounds of this analysis.

Cumulative Effects and Global Climate Change

Proposed Action

For the Scope I and II emissions Perry and Morgan Counties were used as the cumulative effects boundary. For the Scope III emissions, the general region including Gallia, Meigs, Athens and Washington Counties were used as the cumulative effects boundary. The reasoning for this differentiation between Scope I and II and Scope III emissions is because Scope I and II emissions are largely localized to the immediate area surrounding the seven parcels, whereas the Scope III emissions are not likely to take place within the same counties as the parcels. Meaningful discussion of each type of emissions requires they be considered within a context that represents a meaningful scale. For example, the emissions from the mining and subsequent burning of the coal contained within seven parcels is insignificant when compared to global GHG emissions and resulting climate change. Because the Scope I, II and III CO_{2e} emissions are considered low at even a local or regional scale, it is unlikely that purchasing offsets or employing other mitigation would have a measurable impact on global climate change.

Scope I and II Emissions

There are only two facilities within the two county area containing the proposed lease parcels which appear to be required (i.e. are found on the US EPA GHG reporting FLIGHT web interface) to report GHG emissions to the US EPA. Absent other facility data, the information available on GHG emissions is at the county level (Ghosh 2011). Within the area of the seven parcels (Perry and Morgan Counties), the contribution to total GHG emissions from the Proposed Action would be small. As displayed in Figure 13, currently the bulk of GHG emissions within these two counties results from the transportation sector, with electricity and heat production taking up imperceptible slivers of the charts for both counties (Ghosh 2011). Compared to the whole of emissions for the two counties, Scope I and II emissions from coal mining are

negligible. To further put this in perspective, Figure 14 shows the relative amount of total GHG emissions from Perry and Morgan counties in comparison to other counties in southeast Ohio (Ghosh 2011). As displayed, Figure 14 shows that overall GHG emissions are low for the two counties. Unless other categories of emissions are expected to decrease (not foreseen at this time), emissions from coal mining (included in the electricity and heat generation category for this chart) are not anticipated to take up a larger percentage of the county totals in the future. This is because as mining progresses, and the seven parcels are accessed, other areas of the mine are closed and sealed. Thus there should be a net zero increase in annual emissions due to mining over time until the activity ceases. If the Proposed Action were implemented and the seven parcels mined there would be a small increase to total cumulative emissions because mining the parcels adds approximately one year of overall production.

Figure 13: County Level Distribution by Source Categories for GHG Emissions in Southeast Ohio (Ghosh 2011)

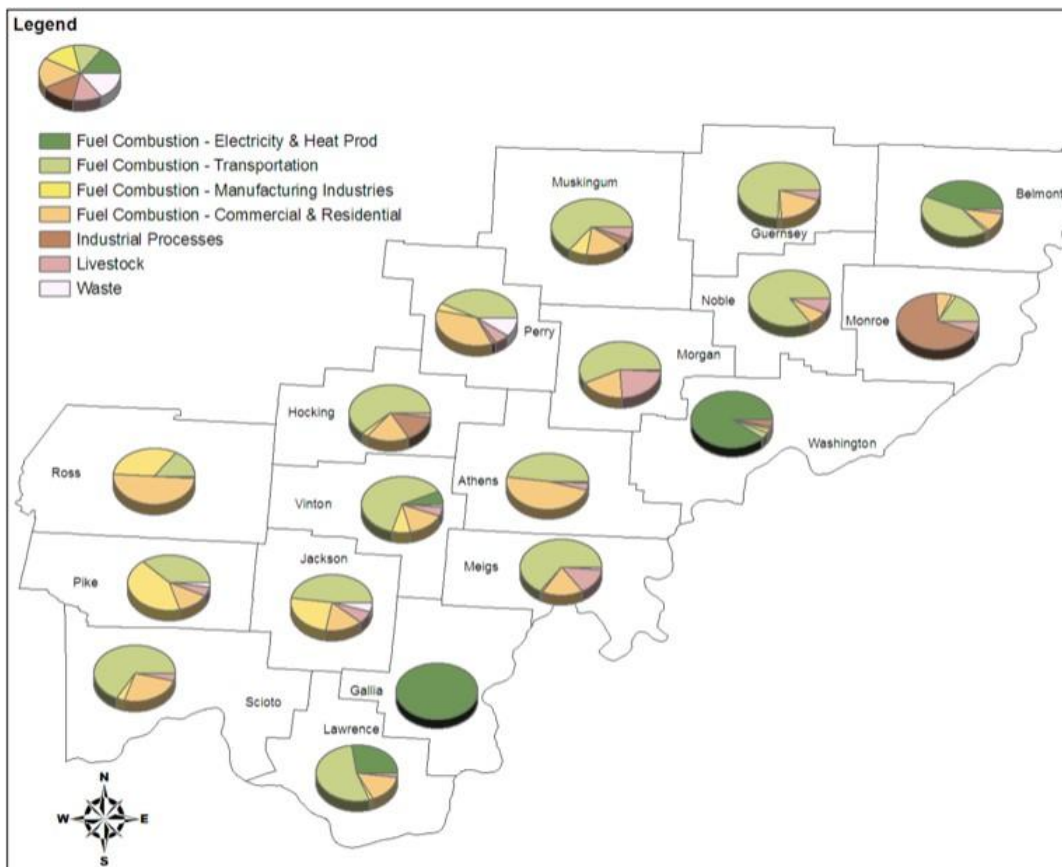
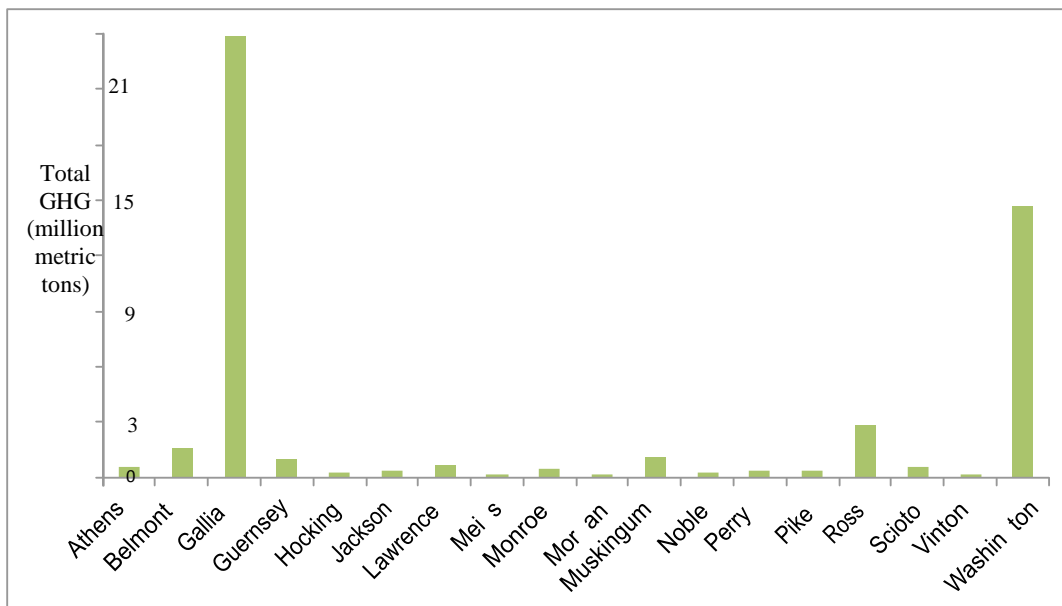


Figure 14: County Total GHG Emissions for Southeast Ohio (Ghosh 2011)



Scope III Emissions

Although it is unknown to what company the mined coal would be sold, it is reasonable to assume that it would be burned in a coal-fired power plant. While neither the WNF nor BLM determines where the coal will be consumed, for the sake of comparison, the reasonable assumption is that the coal would be consumed at a nearby facility. These types of facilities are located in Washington and Gallia Counties. This comparison was done to put into context the amount of GHG emissions relative to emissions in the area where it is assumed the coal would be burned. It should be noted that it is fairly speculative to assume the coal would be burned in this area; however, this was done in order to get a sense of the scale of the potential GHG emissions from burning the coal.

The anticipated total Scope III emissions for the Proposed Action are 2,987,322 metric tons of CO₂e, which represents 9% out of the total GHG emissions within this four county area as recorded in 2011 (Table 8). Again it is important to remember that the emissions from burning coal from the seven parcels would not occur during the same year, since the parcels are noncontiguous and would not be mined in the same year; therefore, the actual annual percentage of the four county total GHG emissions would be some number less than 9%. Figure 13 shows that for Washington and Gallia counties the bulk of GHG emissions are due to energy and heat generation, and Figure 14 shows that total GHG emissions for these two counties are far greater than the other counties within southeast Ohio (Ghosh 2011).

Table 8: Total GHG Emissions for Facilities Required to Report to US EPA, 2011 Data (USEPAa)

County	GHG Emissions
Gallia	17650544 6714414 42048
Gallia total	24407006
Meigs	Non required
Athens	56825 75406
Athens total	132231
Washington	164768 1142295 146726 335652 291351 5364149 54054 959012
Washington total	8458007
Four county total	32,997,244 metric tons CO ₂ e in 2011

For Scope III emissions, there is likely to be no difference in cumulative GHG emissions between the Proposed Action and the No Action Alternative. If the Proposed Action were not implemented and the seven parcels not leased and subsequently mined, it is assumed that the coal needed to generate heat and electricity would be obtained from some other location. Therefore, the GHG emissions from burning the amount of coal to be recovered from the seven parcels would still occur within the four county analysis area, only the origin of the coal would be different.

No Action Alternative

Scope I and II Emissions

Implementing the No Action Alternative would result in a small reduction in total GHG emissions over the life of the mine and within the two county analysis area because if the seven parcels are not leased there would be a reduction of approximately 1 years' worth of coal recovered.

Scope III Emissions

There would be no impact to Scope III GHG emissions within the four county analysis area if the No Action Alternative were selected. This is because electricity and heat generation are largely demand driven. If the coal combusted does not originate from the proposed lease parcels, it will be obtained from other locations. This would result in no reduction of Scope III emissions.

Note on GHG Report: The Scope I emissions were found to be well below the minimum threshold proposed by the CEQ to suggest that analysis could be useful. Commenters brought up the issue of GHG emissions during scoping and since this is the first project of this nature to be analyzed on the Wayne National Forest, there was no basis for comparison to determine if the emissions would be below the proposed threshold. For that reason, the Responsible Official determined that some quantification of emissions could be useful in reaching a decision. It is not expected that a GHG analysis as detailed as this will be completed for other projects in the future.

Air Quality

The primary concerns for air quality related to coal mining stem from the release of particulate matter (PM), sulfur dioxide (SO₂) and nitrogen oxide (NO_x). Effects resulting from the release of these materials include the formation of ground-level ozone, acid rain, haze/reduction in visibility and health-related impacts.

Existing Condition

The analysis area for air quality includes the area surrounding the lease parcels. Because available data is at the county level, this discussion uses all of Perry and Morgan counties. The most recent OEPA report on the state of air quality in Ohio was issued in September of 2012 (OEPA 2012). This report presents data on the seven criteria pollutants (particulate matter (PM) less than 10 microns in diameter, particulate matter less than 2.5 microns in diameter, sulfur dioxide (SO₂), nitrogen dioxide (NO_x), carbon monoxide (CO), ozone and lead), as measured at monitoring stations throughout the state in 2011 (some of the parameters being measured are multi-year averages). For Perry and Morgan counties one criteria pollutant measurement exceeded a maximum allowable concentration. The sulfur dioxide 1-hour mean concentration was exceeded in Morgan County. The established maximum concentration is 75 parts per billion (ppb) and the value recorded was 175 ppb. Measurements for the rest of the criteria pollutants were within the allowable range. It should be noted that of the criteria pollutants, only sulfur dioxide is measured in Perry or Morgan counties. However, PM_{2.5} and nitrogen dioxide are measured in Athens County, ozone is measured in both Athens and Washington counties and lead is measured in Washington County. (OEPA 2012)

Direct and Indirect Effects of Alternatives

Proposed Action

As discussed in the likely development scenario, if the parcels were leased and subsequently mined, 40-50% of the coal may be removed through room and pillar methods. Assuming a 45% recovery rate, this would lead to the removal of 1,576,609 tons of coal. Using the specifications of the existing surface processing facilities, emissions due to the mining, crushing and washing of the coal were estimated (Table 9). Calculations can be found in Appendix A.

Table 9. Estimated Air Emissions from Mining and Processing Lease Parcel Coal

Activity	Emissions (tons)								
	PM	PM10	PM2.5	PM _(inorganic condensable)	PM _(organic condensable)	SO ₂	NO _x	CO	Hydro-carbons
Venting from underground mine	---	---	---	---	---	---	---	---	---
Conveyor transfer	15.77	6.31	---	---	---	---	---	---	---
Crushing	15.77	7.09	---	---	---	---	---	---	---
Washing	2,916.73	---	---	44.93	14.19	---	---	---	---
Storage piles	1.39	---	---	---	---	---	---	---	---
Vehicle use	0.49	---	---	---	---	---	9.88	30.62	2.57
Roads traveled	---	15.32	1.53	---	---	---	---	---	---
Totals	2,934.38	28.72	1.53	44.93	14.19	---	9.88	30.62	2.57

As stated above in the GHG section, the coal that could be mined from the seven lease parcels represents approximately one year's worth of production from the #6 mine. Therefore, the air emissions displayed in Table 9 would also be representative of the estimated air emissions from one year's worth of mining, crushing and washing.

Air emissions are not anticipated to increase over the short term. Because the coal from the seven parcels would replace coal reserves that have been depleted, the emissions from the seven parcels are expected to replace emissions that have already and currently are occurring. It is assumed that the rate of mining would be static, so the coal from the parcels would make up a percentage of coal production on an annual basis. The current condition in regards to air quality and emissions would be maintained into the future. Over the long-term, the addition of the seven parcels into the coal available for mining locally would add one year's worth of emissions, since the coal represents approximately one year's worth of mineable coal. The effects would not be new or increased, they would be extended for the period of one year. While there is one measured parameter of a criteria pollutant that has been exceeded for Morgan County (sulfur dioxide 1-hour mean concentration), it should be noted that the project activities of mining, crushing and washing coal do not contribute to sulfur dioxide emissions. Based on this, it is not anticipated that current local and regional air quality will be significantly impacted by the Proposed Action.

No Action Alternative

Under the No Action Alternative, the new lease area would not be mined and air quality would not change from the baseline. It is likely that the adjacent private land would be mined and emissions would be similar to current conditions for the duration of mining activities.

Cumulative Effects

The cumulative effects area consists of the mining area surrounding the lease parcels. Existing and reasonably foreseeable activities that are relevant to the analysis include past, present and future coal mining, crushing and washing. It is assumed that the rate of mining, crushing and washing the coal would not increase over time; rather the current condition would be maintained for the remainder of activity.

Proposed Action

The proposed project would extend the operation of mining and related activities. These emissions, when considered in the context of other existing and reasonably foreseeable activities in the area, would have a minimal cumulative impact. The proposed project would not result in cumulative impacts on an annual basis because an increase in emissions due to annual operations would not occur. However, a small cumulative impact could occur due to the increase in total air emissions over the lifetime of the mine. The total air emissions over the lifetime of the mine would be increased by the amounts displayed in Table 9 if the Proposed Action were selected.

No Action Alternative

If the No Action Alternative were selected, it is likely that air emissions on an annual basis would remain the same, since the privately-owned coal in the immediate area would still be mined, crushed and washed. Over the long-term, there would be a slight reduction in air emissions versus the Proposed Action. This is because if the coal in the seven lease parcels were not available the mining operations would be completed approximately one year before they would be for the Proposed Action.

Wildlife

Wildlife and Habitat

Wildlife populations are affected by the amount and type of forest that is available to them. Over 300 aquatic and terrestrial vertebrate species, in addition to countless invertebrates, are known to inhabit the Forest sometime during their life cycles (USDA FS 2006a). The existing terrestrial habitat composition on National Forest lands is dominated by mature hardwood forest. Mixed oak and oak-hickory communities dominate the Wayne National Forest landscape with minor

naturally occurring mixed mesophytic and beech forests. Scattered areas of pine occur mainly on ridges.

Oak-hickory forests provide critical habitat to a wide diversity of species. The oak-hickory forest found on the WNF supports numerous wildlife species, particularly by the nuts produced, that are used as forage by many bird and mammal species. The production of acorns for a year is tied to the ability of the state endangered black bear to carry young to full term. A bad nut year will cause the female to reabsorb her fetuses. The leaves and bark of the trees allow for increased feeding opportunities to birds that glean insects from their surfaces and the exfoliating bark of certain trees offer roosting sites for many bat species which include the federally endangered Indiana bat.

Figure 15: Aerial Imagery of Parcels

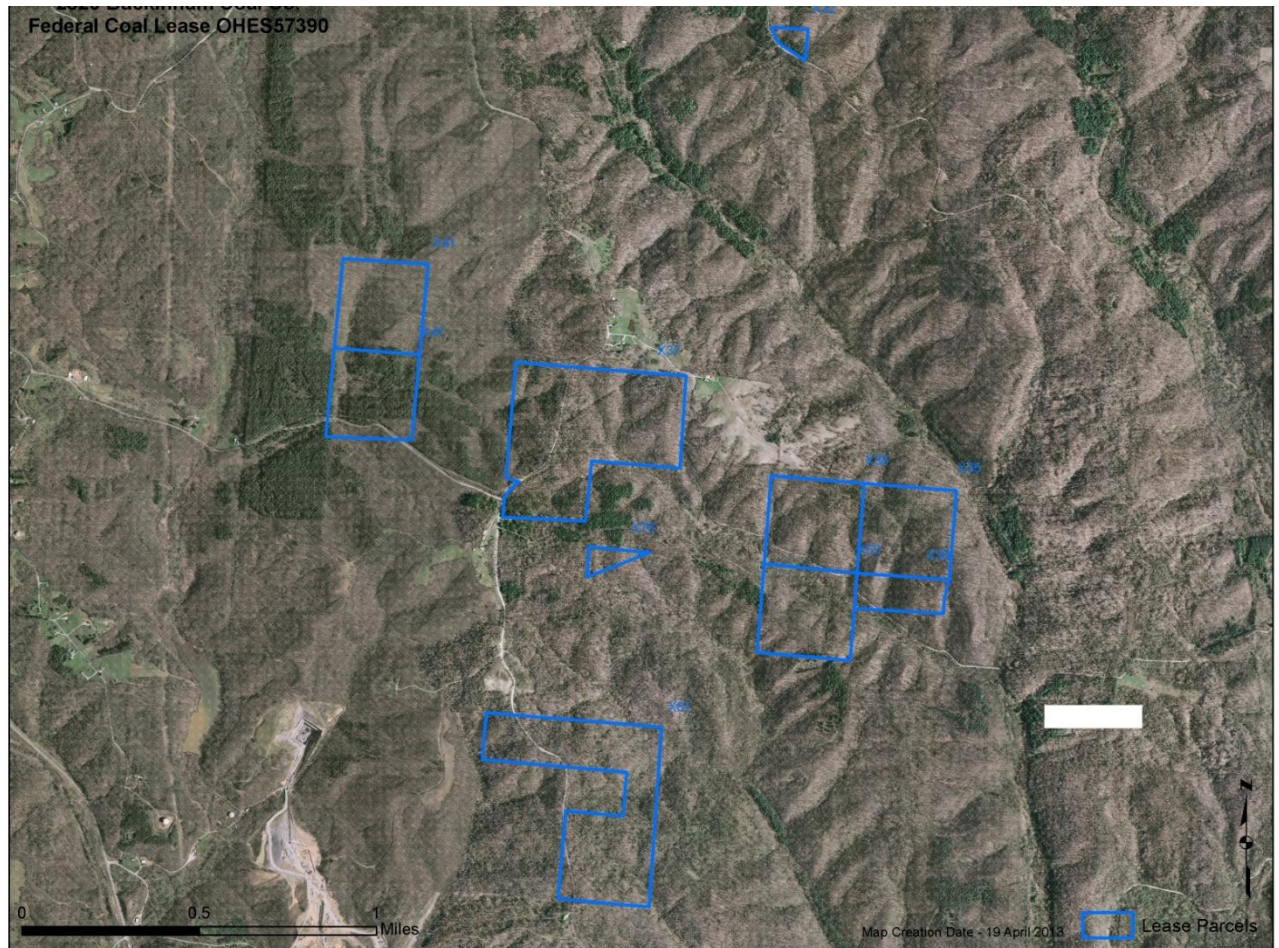


Figure 15 shows an aerial view of the forested landscape in the project area.

The proposed project is to occur underground and no surface disturbance is expected. No loss of habitat or the ability to maintain the habitat will be affected on the surface if the project were to be permitted.

Federally Listed Species

Table 10 provides a list of the federal endangered species that are considered in management activities on the WNF, a brief description of each species' habitat requirements is included as well as whether or not suitable habitat is present within the project area, and whether the potential exists for the species to actually occur in the project area. To date, only the Indiana bat has been documented as a resident species on the WNF. In Ohio, the American burying beetle is considered only to occur in Athens, Hocking and Vinton counties near reintroduction sites. The proposed project does occur within the reintroduction site area.

Indiana Bat

Indiana bats use upland and riparian forests for roosting, maternity sites and foraging activities during the summer. Indiana bats roost underneath loose bark of snags and exfoliating bark of live trees, in splits and crevices of damaged or dead trees and in hollow limbs and boles. Indiana bats have been documented foraging in floodplain, riparian, lowland and upland forests. They tend to forage primarily around, but not within, the canopy of trees and typically are found in closed to semi-open forested habitats and forest edges (USDOI FWS 2007). From mid-August through late October, Indiana bats engage in "swarming" activities in and around the openings of caves and mines. Mating and other social activities are thought to take place during this time as the bats gear up to migrate or go into hibernation.

The entire state of Ohio has been listed by the Fish and Wildlife Service (FWS) as having the potential for Indiana bat occurrences (USDOI FWS 2005). Since 1979, numerous summer mist net surveys, fall swarming surveys, radio-telemetry and hibernaculum censuses have been conducted on the WNF to determine the distribution of this species (see FEIS for 2006 Forest Plan (USDA FS 2006b), Appendix F1-pages 29-32). To date, 24 Indiana bats have been captured on the WNF during summer and fall netting surveys (16 males, 8 females) on the Athens and Ironton Ranger Districts, and up to 333 individuals have been observed in the Ironton hibernaculum (Lawrence Co.) during winter surveys (see Wildlife Biological Evaluation, Appendix B). No Indiana bats have been documented as occurring on the Marietta Unit and none have been found occurring in the Wildcat Hollow area of the Athens Unit during past surveys.

The proposed project is to occur solely underground. No surface disturbance will take place. No items such as air shafts, sediment ponds or other ground disturbing activities related to coal mining will occur on surface lands of the WNF associated with this proposed project; therefore no loss of forest habitat is expected or planned. Current forest habitat will remain in place should this project be permitted.

Table 10. Federally Endangered and Threatened Species for the Wayne National Forest.					
Species	Status	Required Habitat	Suitable Habitat Present? Currently Known Locations	Known or Potential Occurrence Likely?	Determination
Indiana bat <i>Myotis sodalis</i>	Endangered	Roosting: caves/mines in winter; trees with flaking bark, crevices or cavities in spring, summer, and fall. Foraging: in forest canopies with open understories, along forest edges, over ponds.	Yes	Yes, habitat is present; to date no individuals have been captured in this area of the Forest, however, presence is assumed	No Effect
American burying beetle <i>Nicrophorus americanus</i>	Endangered	Broad range, including grasslands, old field shrubland, and oak/hickory forests with open understories.	Yes	Yes, project occurs within the immediate ABB reintroduction area.	No Effect
Fanshell <i>Cyprogenia stegaria</i>	Endangered	Deep water in large rivers.	No-Ohio and Muskingum Rivers	No- habitat and individuals not known to occur in the project area	No Effect
Pink mucket pearly mussel <i>Lampsilis abrupta</i>	Endangered	Deep water in large rivers.	No-Ohio and Muskingum Rivers	No- habitat and individuals not known to occur in the project area	No Effect
Rayed bean <i>Villosa fabalis</i>	Endangered	Stream and small rivers with clean, coarse sand and gravel runs.	No- Scioto River watershed; Scioto Brush Creek	No- not known to occur in Perry or Morgan counties	No Effect
Snuffbox <i>Epioblasma triquetra</i>	Endangered	Small to medium-sized creeks to larger rivers. It occurs in swift currents of riffles and shoals over gravel and sand with occasional cobble and boulders. Probably restricted to mainstems.	No- Ohio and Muskingum Rivers.	No- habitat and individuals not known to occur in the project area	No Effect
Sheepnose <i>Plethobasus cyphus</i>	Endangered	Larger rivers and streams where it is usually found in shallow areas with moderate to swift currents flowing over coarse sand and gravel.	No- Ohio, Muskingum and Walhonding Rivers	No- habitat and individuals not known to occur in the project area	No Effect

American Burying Beetle

The American burying beetle (ABB), a federally endangered species, was once widely spread throughout eastern temperate North America but has since experienced a drastic decline in population numbers and is thought to have been eliminated over nearly its entire range (USDOI

FWS 1991). The ABB appears to occur in a broad range of habitats, including grasslands, old field shrubland and oak-hickory forests with open understories.

The last wild caught ABB reported in Ohio was in Hocking County in 1974. Reintroduction of the beetle to the Athens Ranger District has taken place within the last five years, 2008-2012. The beetles have been placed on two locations on the District and on adjacent private land. The northern-most site of reintroduction of the ABB is located on the ridge where proposed lease parcel x76 is located. Beetles were placed on this ridge for four of the five years of the reintroduction project.

The number of beetles placed at all of the reintroduction sites during the 5-year effort totaled 1019 pairs (2038 individuals). Post reintroduction monitoring surveys have documented successful reproduction and dispersal right after placement; however, at this time there is no documentation of ABB following the winter season.

The proposed project is to occur solely underground. No surface disturbance will take place. No items such as air shafts, sediment ponds or other ground disturbing activities related to coal mining will occur on surface lands of the WNF associated with this proposed project; therefore no loss of forest habitat is expected or planned. Current forest habitat will remain in place should this project be permitted. As mentioned above one of the proposed tracts to be mined occurs almost directly beneath one of the reintroduction sites. Depth to coal maps (Linn Engineering 2012c) indicate that the coal under this tract is approximately 280 feet bgs in the SW corner to approximately 370 feet bgs in the middle-north of the parcel. The depth of coal and the underground mining activity is well out of the reach of the ABB burying and breeding activity.

Mussels (*Fanshell*, *Pink Mucket Pearly*, *Rayed Bean*, *Snuffbox* and *Sheepnose*)

There are five species of federally threatened or endangered mussel that the FWS has identified as having potential to occur within or near the WNF. These species are *Cyprogenia stegaria*, the fanshell mussel, *Lampsilis abrupta*, the pink mucket pearly mussel, *Villosa fabalis*, the rayed bean, *Epioblasma triquetra*, the snuffbox and *Plethobasus cyphyus*, the sheepnose.

The proposed project occurs within the Sunday Creek watershed, which is a tributary drainage to the Hocking River. No occurrences of federally listed mussels are known to occur within the Sunday Creek drainage. Known occurrences of listed mussels include the following:

- | | |
|--------------|--|
| Fanshell - | Ohio and Muskingum Rivers |
| Pink Mucket- | Ohio and Muskingum Rivers |
| Rayed Bean - | Scioto River watershed, Scioto Brush Creek |
| Snuffbox - | Scioto River - Scioto Brush Creek and Muskingum River watersheds;
Ohio River south of Bellville Dam (41 miles downstream from closest
USFS land) |
| Sheepnose- | Muskingum and Ohio Rivers |

The WNF does not have ownership that drains into the Muskingum River or Scioto River watershed. No adverse impact is anticipated to occur to these mussel species as no surface occupancy will occur on WNF lands. Additionally, none of these mussels are known to occur within the watershed that this project will occur in.

Regional Forester Sensitive Species

There are currently twenty-four animal species on the WNF Regional Forester Sensitive Species (RFSS) list (Table 11). RFSS include species documented within the WNF proclamation boundary that are USFWS candidate species, species delisted by the USFWS in the last five years and species with The Nature Conservancy's Global, Trinomial or National Ranks of G1-G3, T1-T3 or N1-N3. Five species were recently added to the WNF's list during a recent review of species. These included: little brown bat, northern bat, tri-colored bat, redbreasted dace (fish) and northern metalmark (butterfly). As a part of this update process, several species were officially removed from the list, including bobcat, eastern sand darter, and round hickorynut.

Table 11: Regional Forester Sensitive Species List; Wayne National Forest

Species	Required Habitat	Known Occurrences
Black bear <i>Ursus americanus</i>	Winter den: dense thickets, hollow logs, tree or rock cavities, and caves. Spring, summer, fall: broad range.	Forest-wide
Little brown bat <i>Myotis lucifugus</i>	Roosting: caves/mines in winter; in buildings, bat houses, trees with loose bark in spring, summer, and fall. Foraging: in forested areas over water, along margins of lakes and streams.	Forest-wide
Northern bat <i>Myotis septentrionalis</i>	Roosting: caves/mines in winter; in trees with crevices or cavities, and bat houses in spring, summer, and fall. Foraging: under forest canopies with cluttered understories, along forest edges and paths, especially in uplands.	Forest-wide
Tri-colored bat (Eastern Pipistrelle) <i>Perimyotis subflavus</i>	Roosting: caves/mines in winter; in dead leaf clusters in tree foliage, especially oaks, and sometimes in buildings in spring, summer, and fall. Foraging: along forested streams and forest edges, in both uplands and bottomlands.	Forest-wide
Bald eagle <i>Haliaeetus leucocephalus</i>	Usually nests in supercanopy trees within ½ mile of large bodies of water.	Closest successful nest is in Hocking County, in a wetland west of Logan. Project area is approximately 20 air miles east from the nest site. Winter occurrences of bald eagles are documented at Burr Oak Reservoir but nesting eagles are currently not known to be present in the area.
Cerulean warbler <i>Dendroica cerulea</i>	Large tracts of mature deciduous woods.	Forest-wide
Henslow's sparrow <i>Ammodramus henslowii</i>	Various grasslands and early successional communities, including reclaimed surface mine areas and some hayfields.	Athens Unit and Ironton Ranger District (RD)

Species	Required Habitat	Known Occurrences
Timber rattlesnake <i>Crotalus horridus</i>	Den: rock outcrops. Summer: mixed deciduous or coniferous forests with closed canopy, heavy leaf litter and little herbaceous cover, and a few rocks or fallen trees.	Limited numbers on Athens Unit (Dorr run area-Hocking Co.) and Ironton RD (DOW 2011)
Blanchard's cricket frog <i>Acris crepitans blanchardi</i>	Spring, summer: in or near permanent water; open mud flats and stream banks with abundant, low emergent vegetation; in lakes and ponds where submergent vegetation grows along shallow shorelines. Winter: soft, muddy bottoms required for hibernation.	Ironton RD only
Eastern hellbender <i>Cryptobranchus alleganiensis</i>	Large slabs of rock or other shelter-providing objects (logs and boards) with loose sand and gravel (not silt) on the bottom of large to medium streams or rivers with fast-moving water.	Marietta Unit (Little Muskingum River)
Four-toed salamander <i>Hemidactylium scutatum</i>	Spring breeding: mossy vernal pools and boggy areas in mature forest. Summer: under logs and other downed woody material in moist forest near breeding habitat. (Sphagnum moss is commonly abundant in suitable habitat.)	Ironton RD only
Green salamander <i>Aneides aeneus</i>	In Ohio: south-facing or unshaded, moist crevices in rock outcrops, within 7-10 miles of the Ohio River, which is the northern limit of this species' range.	Ironton RD only
Mud salamander <i>Pseudotriton montanus</i>	Stream bank burrows or muddy areas under large, flat stones or logs along shallow, sluggish woodland streams, springs, and seeps.	Ironton RD only
Ohio lamprey <i>Ichthyomyzon bdellium</i>	General: Ohio River or the lower courses of its larger tributaries; Spawning: large extensive riffles common in the middle reaches of large Ohio River tributaries.	Marietta Unit (Little Muskingum R.)
Western lake chubsucker <i>Erimyzon sucetta</i>	High-quality pothole lakes and glaciated streams with submerged vegetation and sand or fine gravel bottoms.	Ironton RD only
Redside dace <i>Clinostomus elongatus</i>	High-quality small streams with deep pools and woody debris in forested watersheds.	Tributaries to Witten Fork (Little Muskingum River watershed) and Ohio River
Salamander mussel <i>Simpsonia ambigua</i>	Medium to large rivers on mud or gravel bars and under flat slabs or stones.	Marietta Unit (Little Muskingum R.); Ironton RD (Symmes Creek)
Lilliput <i>Toxolasma parvus</i>	Ponds, lakes, and creeks to large rivers in mud, sand, or fine gravel.	Athens Unit (Hocking R.); Ironton RD (Symmes Creek)
Little spectaclecase mussel <i>Villosa lienosa</i>	Small- to medium-sized streams in sand or gravel.	Ironton RD (Symmes & Pine Creeks)

Species	Required Habitat	Known Occurrences
Green-faced clubtail <i>Gomphus viridifrons</i>	Egg-laying: medium to large, clear-flowing rivers with mixture of gravelly sand and silt among rocks. Feeding (in and around breeding habitat): larvae burrow in silt; adults forage in trees.	Marietta Unit (Little Muskingum River watershed)
Rapids clubtail <i>Gomphus quadricolor</i>	Egg-laying: clear streams and brooks with strong currents and riffles over clean gravel, cobbles, or bedrock. Feeding (in and around breeding habitat): larvae burrow in silt; adults forage in trees.	Marietta Unit (Little Muskingum River watershed)
Southern grizzled skipper <i>Pyrgus wyandot</i>	Disturbed openings in mature oak forests where host plant Canada cinquefoil grows, including open hillsides, disturbed ridgetops, powerline cuts, and roadsides; especially drier south-facing sites.	Athens Unit (Dorr Run area, Hocking Co.)
Northern Metalmark <i>Calephelis borealis</i>	Habitat patches (preferably multiple) occur within forested or wooded areas. Such openings may be natural outcrops of shale or limestone barrens, glades or powerline right of ways.	Athens and Ironton Units (Aid Twp, Lawrence, Perry, and Athens Co.)

The proposed project is to occur underground and no surface disturbance is expected. No loss of habitat or the ability to maintain the habitat will be affected on the surface if the project were to be permitted. Therefore, no adverse impacts are expected to occur with any RFSS that may be present.

Management Indicator Species (MIS)

The National Forest Management Act (NFMA) regulations direct the Forest Service to select and track species that are of special interest or indicative of management trends. These are called management indicator species. Eight bird species, in combination with three forest community types or habitats, were selected as management indicators. These species and the habitat that they are indicative of are contained in Table 12.

Table 12: Selected MIS and associated habitat

Management Indicator	Habitat
Pine Warbler	Mature pine and pine hardwood communities
Pileated Woodpecker	Mature to overmature hardwood forest with snags and coarse woody debris on the forest floor
Cerulean Warbler	Mature interior hardwood forest with a heterogeneous canopy
Worm-eating Warbler	Mature interior hardwood or pine-hardwood forest on hillsides with a dense understory and coarse woody debris on the forest floor

Louisiana Waterthrush	Mature riparian forest corridors along headwater streams; healthy aquatic habitat
Ruffed Grouse	Mosaic of early-, mid-, and late-successional forest
Yellow-breasted Chat	Early successional forest habitat
Henslow's Sparrow	Extensive grasslands
Oak-Hickory Forest	Forest stands dominated by oak and hickory species
Native Pine Forest	Forest stands dominated or partially comprised of one or more native pine species
Early Successional Forest	Forest stands less than 20 years of age

Site-specific monitoring or surveying of a proposed project or activity area is not required by the NFMA regulations. Forest Service direction requires assessment of the effects of management activities on MIS, with the intent of maintaining viable populations of these species and the species with similar habitat that they represent. MIS are usually not rare species, but are common species that can be easily monitored.

In 2003, biologists on the Wayne National Forest developed a breeding bird monitoring protocol that incorporated methodologies used in both the North American Breeding Bird Survey (Sauer et al. 2001) and the Land Manager's Guide to Point Counts of Birds in the Southeast (Hamel et al. 1996). Twenty-three sampling routes were established both along roads, and along walking trails through various habitats on the Forest. These routes have been surveyed annually since that time to establish baseline and eventually trend data. A sampling route was established in the Wildcat Hollow area and all species of MIS birds, with the exception of the Henslow's Sparrow and the Ruffed Grouse have been documented as occurring in the area. Even though no Ruffed Grouse have been documented on the Wildcat Hollow breeding bird route to date WNF biologists have seen them on Irish Ridge Road in the area of intense tree cutting on private land near the proposed lease parcels.

The proposed project is to occur underground. Therefore, no change in MIS trend data or change in species populations, associated with this project, will occur as no surface disturbance or manipulation of surface habitat will take place.

Cumulative Effects

Since no direct or indirect impacts to federally threatened or endangered species, Regional Forest Sensitive Species or Management Indicator Species are anticipated due to implementing the proposed action, there would be no cumulative effects.

No Action Alternative

Because the proposed action does not involve surface activities, the description of potential effects from that section would also apply to the no action alternative.

NOTE: *The following evaluations are concise write-ups of the conclusions drawn by resource experts. These resource areas were not raised as potential issues during public scoping or the impacts were expected and then shown to likely be immeasurable, inconsequential or non-existent. This is due to the nature, scale and scope of the activity proposed, which would likely lead to mining of the parcels with no surface activities.*

Botanical, Cultural, Soil and Recreation Resources

Because the project mitigations/stipulations specify no surface use, there will be no ground disturbance due to the project. It is unlikely that implementation of the proposed action and any subsequent mining will impact botanical, cultural, soil or recreational resources because it will not involve any ground disturbance. Because there will be no impacts due to project implementation, there would also not be any cumulative effects due to the combination of effects from this project and others occurring in the area. The impacts of the no action alternative would be expected to be the same, since there would still be no surface activities on the proposed lease parcels. Individual resource reviews are contained within the Project Record.

Chapter 4 - Consultation and Coordination

The Forest Service consulted the following individuals, Federal, state and local agencies and non-Forest Service persons during the development of this environmental assessment:

ID TEAM MEMBERS:

Rich Jones, WNF Lands, Minerals and Special Uses Program Manager
Rachel Orwan, WNF NEPA, Appeals and Litigation Coordinator
Troy Thompson, USFS Region 9 Hydrogeologist
Pam Stachler, WNF Hydrologist
Lynda Andrews, WNF Wildlife Biologist
Cheryl Coon, WNF Botanist
Chris Euler, WNF Heritage Resource Specialist
Latasha Lyte, WNF Soil Scientist
Dawn McCarthy, WNF Assistant District Ranger for Recreation
Theresa Bodus, BLM
Timothy Howell, BLM
Matt Silvey, BLM

FEDERAL, STATE, AND LOCAL AGENCIES:

Liane Mattson, USFS Centralized National Operations, Solid Leasable Minerals Geologist
Chuck Sams, USFS Regions 8 and 9 Air Quality Specialist
Mike Hiscar, Office of Surface Mining
William Hagedorn, Mining Safety and Health Administration, Supervisor, St. Clairsville Office
Jenny Finfera, USFWS
R. Scott Stiteler, Environmental Specialist 3, Ohio Department of Natural Resources, Division of Mineral Resources Management

OTHERS:

Albert Siemer, Buckingham Coal Company, Mine Engineer